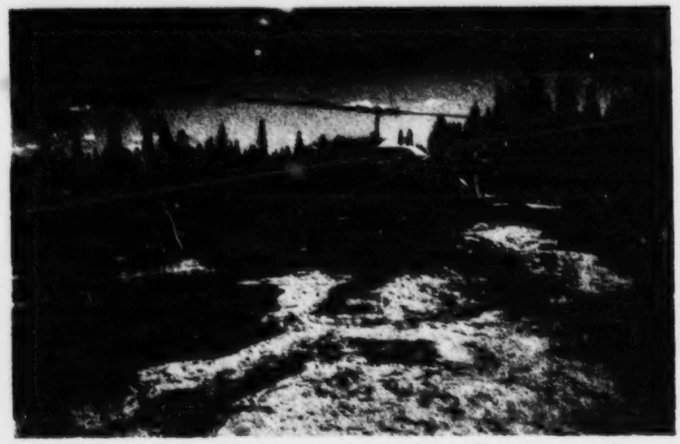
MINERALS

ECONOMIC & REGIONAL DEVELOPMENT AGREEMENT

Sector A
Geoscientific Activities
Progress Report
1985 · 86



Canada

Manitoba

86-05247/ ·

CANADA-MANITOBA MINERAL DEVELOPMENT AGREEMENT (MDA)

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CANADA - MANITOBA

MINERAL DEVELOPMENT AGREEMENT

1984-89

SECTOR 'A' GEOSCIENTIFIC ACTIVITIES

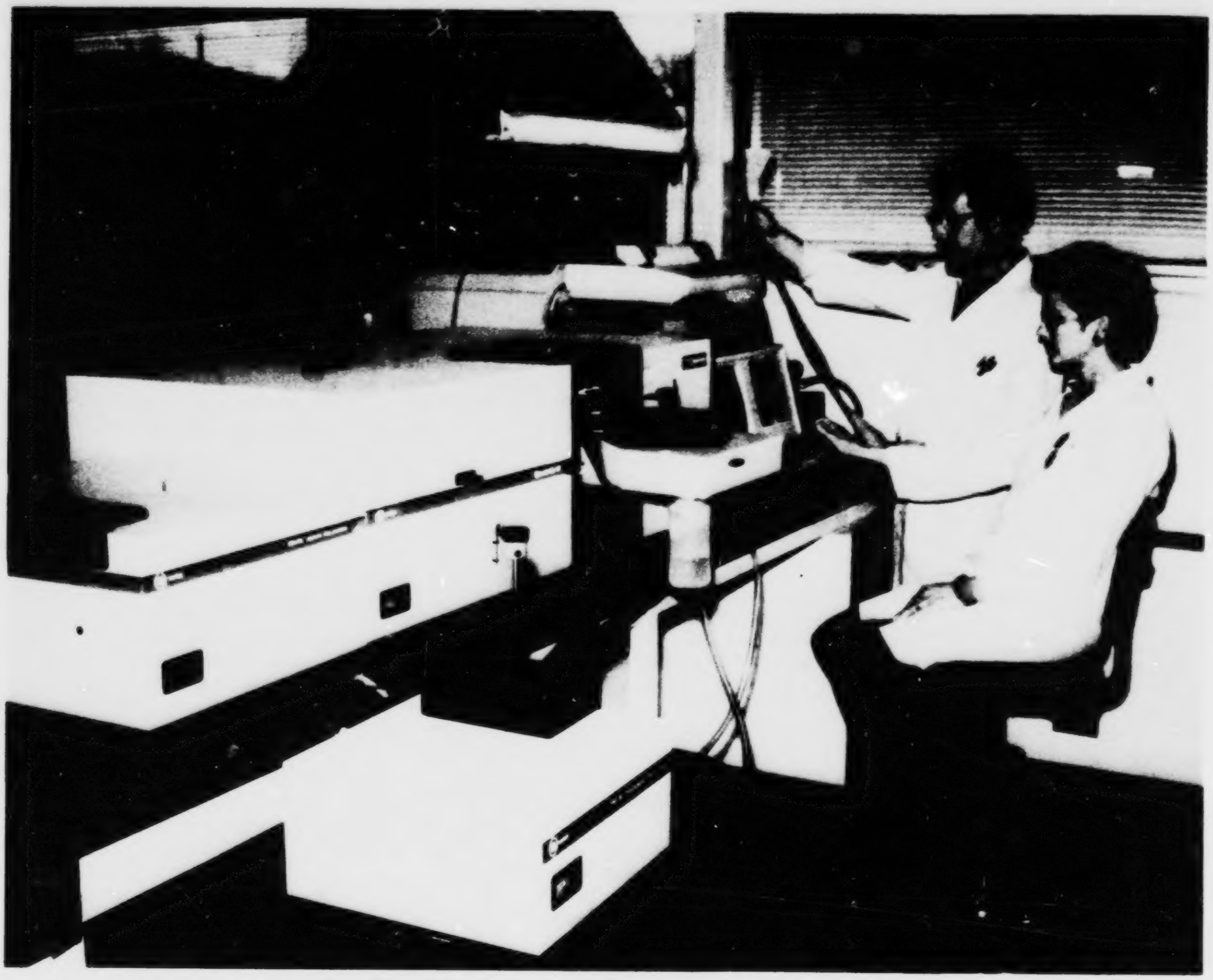
PROGRESS REPORT 1985-86

Manitoba

Energy and Mines

Geological Services

Open File Report OF86-4



Frontispiece: Rock and mineral analysis using atomic absorption spectrophotometry, Logan Avenue Laboratory, Winnipeg.

FOREWORD

This report outlines progress made by the Provincial and Federal geological survey organizations, in the second year of cooperative programming mounted under the Canada-Manitoba Mineral Development Agreement, a subsidiary Agreement to ERDA.

Release of the information, at this time, is intended to provide the mineral industry with an up-to-date review of activities conducted during the 12-month period ending March 31, 1986, as well as an outline of projects scheduled for implementation during 1986-87.

The report should be regarded as a supplement to other publications, released throughout the lifetime of the Agreement, as well as annual reports of field activities issued each November and January by Manitoba and Canada, respectively.

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I. CANADA-MANITOBA

MINERAL DEVELOPMENT AGREEMENT

1984-89

BACKGROUND

Under the terms of the Canada-Manitoba Mineral Development Agreement, Canada and Manitoba will spend $24.7 million from 1984-1989 (Table 1), conducting geological, geochemical and geophysical surveys, and mineral economic studies, as well as research into new mining technology developments and marketing. The goal is to increase the level and effectiveness of mineral exploration and extraction, and to help diversify the current mineral base of the Province.

The work to be accomplished under the Agreement has been organized into four sectors (Fig. 2): A - Geoscientific studies, B - Mining & Minerals Technology, C - Development Studies, D - Public information, evaluation and administration. Program design is coordinated and approved by a Federal/Provincial Management Committee with parallel delivery by the respective organizations.

Sector A - Geoscientific activities are implemented by the Geological Survey of Canada (GSC) and the Manitoba Geological Services Branch (MGSB). Programs are organized into five categories: 1 - Precambrian Geological Investigations, 2 - Mineral Investigations, 3 - Geophysical Surveys, 4 - Geochemical Surveys and Glacial Prospecting, and 5 - Geological Compilations.

Industry input to program design is encouraged at public meetings, briefing sessions and field demonstrations, held at various points throughout each year, and is formalized through the Mineral Exploration Liaison Committee representing the Mining Association of Manitoba, the Canadian Institute of Mining & Metallurgy (Winnipeg Section), the Prospectors & Developers Association, and the Manitoba/Saskatchewan PDA.

In this the second year of the Agreement, Federal and Provincial activities were accelerated to full operational levels (Table 2).

Virtually all program commitments made for fiscal year 1985-86 were attained by March 31, 1986.

Geoscientific activities by the Provincial and Federal Geological Surveys resulted in comprehensive coverage of all major target areas (Lynn Lake, Leaf Rapids, Flin Flon and Snow Lake, etc.). Technical seminars were held on several occasions to provide statements of progress and these were augmented by the release of numerous reports and maps throughout the year.

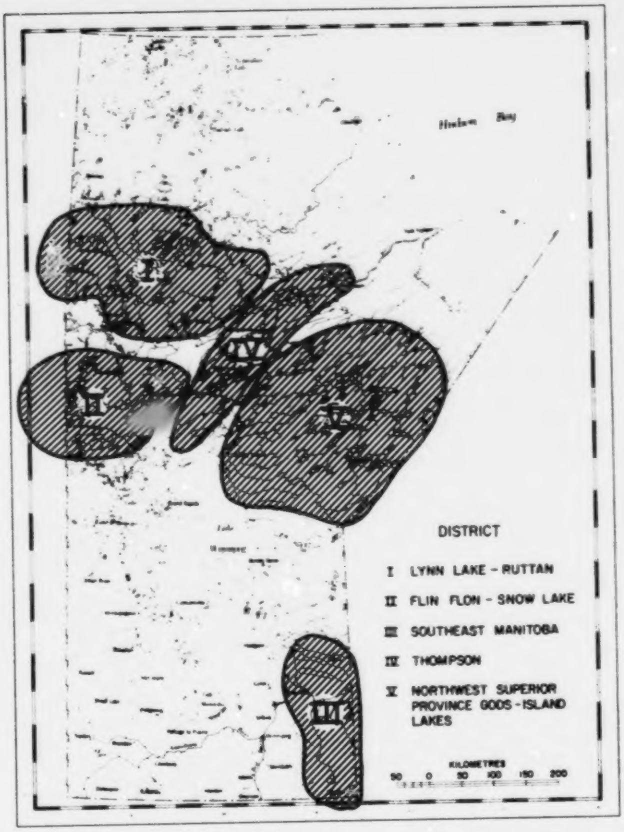
Hudson Bay
Lake Winnipeg
I
II
III
IV
V
DISTRICT
I LYNN LAKE - RUTTAN
II FLIN FLON - SNOW LAKE
III SOUTHEAST MANITOBA
IV THOMPSON
V NORTHWEST SUPERIOR PROVINCE GODS-ISLAND LAKES
KILOMETRES
50 0 50 100 150 200

Figure 1: Canada-Manitoba Mineral Development Agreement: Focus of 'Sector A' Geoscientific Activities.

Table 1

CANADA-MANITOBA MINERAL DEVELOPMENT AGREEMENT
SCHEDULE "B"
Summary of Costs 1984-89
($000,000's)

Sector/Program/Project	Federal Share	Provincial Share	Total Costs 5-Years
SECTOR A GEOSCIENTIFIC ACTIVITIES			
Program 1. Precambrian Geological Investigations			
— Detailed geological mapping; drilling		1.1	1.1
— Regional geological models; drilling	0.9		0.9
Program 2. Minerals Investigations			
— Detailed metallic and industrial minerals studies; applied research		2.05	2.05
— Mineral deposit models	1.25		1.25
Program 3. Geophysical Surveys	2.45		2.45
Program 4. Geochemical Surveys and Glacial Prospecting			
— Regional geochemical surveys	2.05		2.05
— Quaternary geology surveys	0.85		0.85
— Detailed environmental geochemistry and glacial prospecting		0.25	0.25
Program 5. Geological Compilation			
— Various compilation and information outputs		1.6	1.6
— Quaternary geology atlas; data systems	0.5		0.5
Subtotal Sector A	8.0	5.0	13.0
SECTOR B RESEARCH AND TECHNOLOGY			
Program 1. Mining Technology		.75	.75
2. Mine Safety and Productivity			
Project 2.1 Ground Control	1.32		1.32
2.2 Warning Systems	.295		.295
2.3 Exposure Index		.295	295
Program 3. Processing Technology			
Project 3.1 SO_2 Reduction	2.180		2.180
3.2 Milling Research	.470		470
3.3 Tailings Research		1.10	1.10
3.4 Industrial Minerals	4	62	1.02
Subtotal Sector B	4.665	2.765	7.43
SECTOR C DEVELOPMENT STUDIES	885	.885	1.77
SECTOR D PUBLIC INFORMATION, etc.	1.25	1.25	2.5
TOTAL	14.80	9.9	24.70

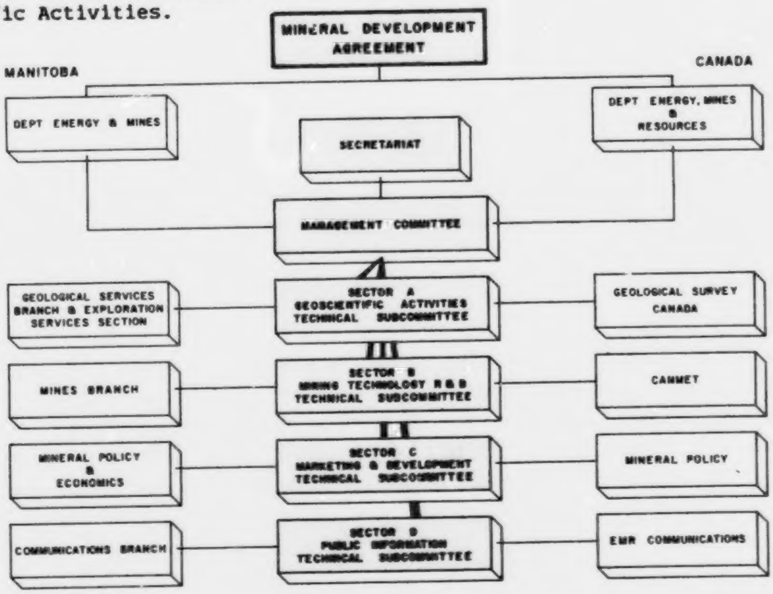
MINERAL DEVELOPMENT AGREEMENT
MANITOBA
CANADA
DEPT ENERGY & MINES
SECRETARIAT
DEPT ENERGY, MINES & RESOURCES
MANAGEMENT COMMITTEE
GEOLOGICAL SERVICES BRANCH & EXPLORATION SERVICES SECTION
SECTOR A GEOSCIENTIFIC ACTIVITIES TECHNICAL SUBCOMMITTEE
GEOLOGICAL SURVEY CANADA
MINES BRANCH
SECTOR B MINING TECHNOLOGY R & D TECHNICAL SUBCOMMITTEE
CANMET
MINERAL POLICY & ECONOMICS
SECTOR C MARKETING & DEVELOPMENT TECHNICAL SUBCOMMITTEE
MINERAL POLICY
COMMUNICATIONS BRANCH
SECTOR D PUBLIC INFORMATION TECHNICAL SUBCOMMITTEE
EMR COMMUNICATIONS

Figure 2: Federal-Provincial liaison network and government agencies contributing to programming under the Canada-Manitoba Mineral Development Agreement (1984-89).

II. SECTOR A

GEOSCIENTIFIC ACTIVITIES

PROGRESS REPORT

REVIEW OF ACTIVITIES - 1985-86

On February 26th, 1985, the Management Committee approved the Sector A Workplan for 1985-86 comprising 20 Federal and 60 Provincial Geoscientific projects (including eighteen contributions contracted through universities in Manitoba (10) and elsewhere in Canada (8)).

Copies of the Workplan were forwarded to members of the newly-formed Mineral Exploration Liaison Committee, on March 28th, together with a request for feedback that might be built into the proposed field programs.

Survey crews were deployed in May, the Provincial operations being supported by 52 university students who were trained and employed for a total of 4,171 days.

Regional briefings were given to the Lynn Lake Town Council and in each of the Mining districts, as well as field tours and demonstrations for the benefit of geologists from industry and other agencies.

Field operations continued throughout the summer, the principal focus being documentation of the geology and mineral resources in the Lynn Lake and Flin Flon regions. Provincial surveys undertaking resource definition and evaluation in the Thompson belt, the Gods-Island Lake region and S.E. Manitoba were augmented by complementary GSC investigations in several of these areas.

The first Progress Report, covering all aspects of MDA geoscientific programming during fiscal 1984-85, was released in September 1985.

The results of the 1985 field program were reported at the annual Meeting with Industry in Winnipeg on November 19th and 20th (270 registrants). A Report of Field Activities (260 p.), sixteen Preliminary Maps, and four other Technical reports were released at that time, along with displays and talks on various aspects of the Provincial, Federal and University programming.

The first formal meeting of the Mineral Exploration Liaison Committee was held on November 21st to invite comment from Industry on the acceptability of the programming, as well as suggestions for new initiatives or modifications to the existing format.

A subsequent letter from the regional representative of the PDA to National President, PDA, endorsed the focus and scale of the programming and acknowledged the input of both Federal and Provincial agencies, indicating that "the program as a whole remain as planned and scheduled . . . . .".

For the balance of the year Provincial and Federal staff engaged in compilation and analysis of materials and results stemming from the previous field season, as well as report production and talks given at various technical seminars, in Manitoba and across Canada.

Figure 3: Drill core retrieval, Darrol Lake, January 1986.

During 1985-86 Manitoba Geological Services Branch staff responded to 483 enquiries on minerals-related topics, in addition to other exchanges at the annual meeting in Winnipeg, and enquiries (225) received at the Provincial display booth at the annual convention of the Prospectors & Developers Association (3,500 delegates).

MDA displays were also featured at the GSC Forum in Ottawa (January 22nd-23rd, 1986, 550-600 registrants), and GSC progress reports in Current Research, GSC Paper 86-1A.

MDA geoscientific output was a contributing factor to elevated or intensified levels of private sector exploration in the Lynn Lake district, north of Flin Flon, south of Athapapuskow Lake, in the Fox River Sill area, at Bigstone-Island and Gods Lakes and in the Bissett district.

Reports and information arising from the evaluation of dimension stone resources in the Lac du Bonnet-Whiteshell area contributed directly to a new interest in the production of granite tiles from sites in S.E. Manitoba and to current site evaluations being undertaken by commercial operators. In the same context a field tour and discussions with Parks Branch officials were initiated to demonstrate the socio-economic advantages and minimal environmental impact of such quarrying operations.

Data stemming from the Regional Lake Sediment Sampling program conducted by the GSC continues to be of interest to Provincial environmental acid rain concerns. Water samples collected by the federal agency were analyzed in the Provincial William Ward Technical Services Laboratory to provide otherwise unavailable data on the regional distribution of potentially vulnerable aquatic systems.

The Province successfully demonstrated the utility of basal till sampling, as an aid to detecting buried ore bodies, and this technique has subsequently been adopted by three companies operating in the Lynn Lake and Flin Flon regions.

An active drill core retrieval program (29 collections, totalling 33 979 m of core) has triggered a corresponding increase in public utilization (78 days use of storage and examination facilities compared to 38 industry visits in 1984-85) and attendant stimulus to exploration in the Lynn Lake and Flin Flon regions.

Sector A personnel also provided continuing support throughout the year to other Sectoral activities including Sector B - chromite evaluation in the Bird River area, and drilling of tailings at Sherridon; Sector C - dimension stone field evaluation, site selection and sample testing; development of a pamphlet on Manitoba's industrial minerals; sampling of kaolin on Black Island and an evaluation of natural cement rock resources; Sector D - development of brochures on basal tills and other topics; establishing a comprehensive framework for evaluating MDA output and impact; and in the production of audio visuals.

A full listing of all geoscientific technical publications and other output generated during fiscal 1985-86 is presented in the section following the individual project descriptions.

Applied Geoscience Research

University participation in the conduct of MDA projects continues at a high level with eighteen research agreements, ten of which are with the University of Manitoba, the others with universities at Carleton, Western, Waterloo, Windsor and with the Royal Ontario Museum. Eleven of the eighteen theses being developed in conjunction with MDA activities are with the University of Manitoba.

Geochronological and petrological contributions are also being made by the University of Kansas and geologists from NASA, Texas.

TABLE 2

GEOSCIENCE EXPENDITURE SUMMARY*
1985-86

	LYNN LAKE RUTTAN	FLIN FLON-SNOW LAKE	SOUTH-EAST MAN.	THOMPSON	GODS-ISLAND	MAN. GENERAL	TOTAL
$ Allocated (x 1,000)							
FEDERAL	400.1	977.1	80.6	258.0	67.2	-	1783.0
PROVINCIAL	314.3	303.6	184.1	113.0	125.1	480.3	1520.4
TOTAL	714.4	1280.7	264.7	371.0	192.3	480.3	3303.4
%TOTAL	22	39	8	11	6	14	100

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* Provincial levels represent actual expenditures to March 31, 1986: Federal expenditures are projections based on original allocations.

III. PROJECT REPORTS

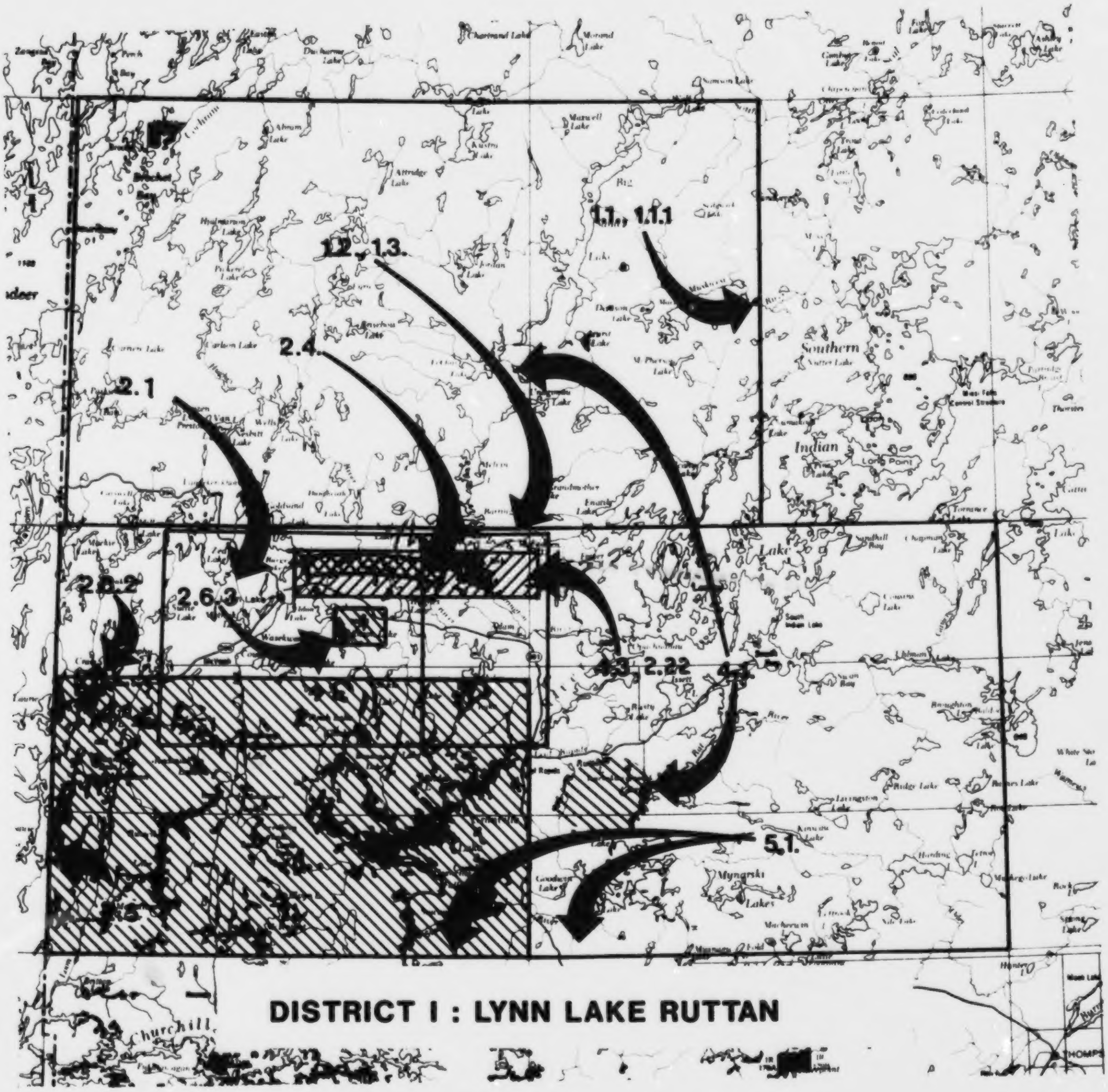
INTRODUCTION

The following project descriptions outline Geoscientific Activities conducted during 1985/86 under Sector A of the Canada-Manitoba Mineral Development Agreement, a subsidiary agreement to ERDA.

The objectives of the program are to provide scientific and technical information on the whereabouts, nature and composition of rock and mineral formations in the Province that will ultimately lead to greater and more effective use of these resources.

The information generated as a result of these investigations and exploratory surveys is intended to:

- improve the effectiveness of mineral exploration in established mining districts, especially those now experiencing a rapid depletion of ore reserves;
- identify new exploration targets in promising mineral areas;
- explore the potential for diversifying the mineral base in areas dependent on a single or limited number of commodities; and
- promote increased awareness of Manitoba's mineral development potential by giving greater visibility to the Province's significant and diverse mineral attributes.



Manitoba Geological Services Branch:

1.1	Geological mapping Brochet-Big Sand Lake
1.1.1	U-Pb geochronology SIL-Chipewyan districts
1.2	Uranium/Lead isotope investigations
1.3	Rubidium-strontium investigations
2.1	Mineral occurrence documentation - Lynn Lake area
2.4	Rock geochemistry, biogeochemistry and stratigraphy of the Agassiz Metallotect
2.5	Industrial Minerals evaluation
2.6.2	Lar deposit
2.6.3	Gold deposits, Cartwright Lake
2.22	Deposit documentation, Barrington Lake area
2.27	Remote Sensing Computer Evaluation
4.1	Basal Till investigation, Ruttan
4.3	Basal Till Agassiz Metallotect
5.1	Synoptic geological compilation map
5.3	Lynn Lake reports and maps

Geological Survey of Canada: (not shown)

C.1.1.2	Metamorphism in the Lynn Lake-Laurie Lake Area
C.2.2.2	Metallogeny of mafic-ultramafic rocks, northern Churchill Province
C.4.1.2	Glacial prospecting
C.4.1.4	Quaternary geochemistry

Figure 4: Location of MGSB projects (1985)

DISTRICT I. LYNN LAKE-RUTTAN

Summary and Project listing:

Geological surveys and mineral investigations established key geological factors controlling mineralization in the Lynn Lake-Ruttan region, and provided guidelines for mineral exploration activities aimed at discovering new base and precious metal ore deposits. Provincial and Federal surveys generated much improved geological base maps, as well as airborne geophysical and geochemical data, in areas considered to have a high exploration potential.

Uranium-lead and rubidium-strontium isotope techniques were used to determine the age of the geological formations, and to obtain information on their potential to contain gold, copper and zinc ore deposits. Glacial dispersion fans of ore minerals, derived from buried mineralized zones, were measured and used as indicators to locate concealed deposits in Precambrian bedrock.

Continued testing of biogeochemical techniques for detecting and tracing buried mineralized zones involved sampling of peat bog, spruce needles and other vegetation in the area between Dot and Barrington Lakes.

The new geological data permitted an up-to-date interpretation of recent airborne geophysical and ground geochemical data, enabling a more accurate extrapolation of bedrock geology and associated mineral potential into areas of poor exposure and thick overburden.

1:250 000 synoptic maps for the Lynn Lake-Ruttan Lake areas (NTS 64B and 64C) represent a new format for communicating up-to-date compilations of geological data and syntheses.

MANITOBA GEOLOGICAL SERVICES BRANCH

PROJECT 1.1: Geological mapping, Big Sand-Brochet area

INVESTIGATOR: D.C.P. Schledewitz

OBJECTIVES:

To provide an updated and more detailed map and comprehensive report on NTS areas 64F and 64G to assist mineral exploration and evaluation of regional geochemical data.

PROGRESS:

Map production is almost completed; a report is being prepared, and will be completed in 1988.

PRODUCTS:

Two preliminary compilation maps, 64F and 64G, were submitted to the GSC for evaluation and display of regional lake sediment data. A regional geological summary describing the distribution and petrology of granitic rocks is being prepared as background to developing a proposal for a lithoprobe transect across the Trans-Hudson Orogen.

FOLLOW-UP AND IMPLICATIONS:

A zone of mineralization outlined by mapping in the Le Clair Lake area yielded encouraging results during a subsequent basal till sampling program (by E. Nielsen, Project 4.1). The results are to be published as an open file.

PROJECT 1.1.1: U-Pb zircon geochronology - Lynn Lake region (R.V.S.)

INVESTIGATORS: R. Van Schmus (University of Kansas)
D.C.P. Schledewitz

OBJECTIVES:

To provide precise age determinations of major plutonic rock units in the Lynn Lake, Southern Indian and Chipewyan districts.

PROGRESS:

Four of eight samples collected in 1984 from the Big Sand Lake area have been analyzed. Eight units from the Lynn Lake and Leaf Rapids domain were sampled in 1985.

PRODUCTS:

Isotope ages were used in the compilation maps 64B and 64C, printed in March 1986 and July 1986, respectively. The significance of the ages was discussed in a contribution to MGSB Report of Field Activities 1985 (GS-1).

FOLLOW-UP AND IMPLICATIONS:

- Collection of three more units in 1986.
- Analyses of remaining samples.
- Current results indicate that the Chipewyan batholith has an age of 1854-1864 Ma similar to that of the Wathaman Batholith.

PROJECT 1.2: Uranium-Lead isotope investigations, Southern Churchill Province

INVESTIGATORS: D.A. Baldwin, A.H. Bailes, E.C. Syme*, H.V. Zwanzig (Geological Services Branch);
T.M. Gordon*, P.A. Hunt, R.D. Stevens (Geological Survey of Canada)

OBJECTIVES:

To determine, by U-Pb isotope analysis, the ages of selected rock units in the Lynn Lake and Flin Flon regions. Accurate ages of volcanic and intrusive rock units comprise an essential part of the geological data base, and indirectly date the formation of enclosed base and precious metal deposits.

PROGRESS:

Four samples from the Flin Flon-Snow Lake belt were collected in 1985, two from the Flin Flon area and two from Snow Lake. These samples are presently being analyzed at the GSC geochronology laboratory.

PRODUCTS:

An abstract summarizing the results of investigations in the Lynn Lake belt was published in conjunction with the May, 1985 Annual Meeting of the Geological Association of Canada. The manuscript of a paper to be published in a technical journal was also completed: "U-Pb zircon ages from the Lynn Lake and Rusty Lake metavolcanic belts, Manitoba: two ages of Proterozoic magmatism", by D.A. Baldwin, E.C. Syme, H.V. Zwanzig, T.M. Gordon, P.A. Hunt and R.D. Stevens. Results of the Flin Flon-Snow Lake investigations will be published upon completion.

FOLLOW-UP AND IMPLICATIONS:

In 1986 further sampling will be conducted in the region, to provide a more comprehensive aspect to the data base now established. These age determinations will permit new interpretations to be made on the timing of geological events in the southern Churchill Province.

*Investigators responsible for project

PROJECT 1.3/1.16: Rubidium-strontium geochronology in Manitoba

INVESTIGATOR: G.S. Clark, University of Manitoba

OBJECTIVES:

This is a continuation of work initiated in 1979 to determine Rb-Sr ages from lithotectonic domains of the Churchill and Superior provinces in northern Manitoba. The establishment of a geochronological framework is an essential supplement to field mapping for constructing models of crustal evolution within the various domains and the relationship of the domains to one another, in order to identify the most favourable targets for future exploration programs.

PROGRESS:

Over the past year, whole-rock ages were determined for two rock units from Cross Lake, two granites from the southwestern area of the Chipewyan batholith, and an early granitoid from the northwestern part of the Southern Indian domain. Samples of pseudotachylite and contact metamorphic rocks associated with the Molson dykes in the northern Superior Province are now being processed for isotopic analysis, but completion of analytical work has been interrupted by the move into the new Geological Sciences building.

PRODUCTS:

The results of the work completed during 1985 were published in the Manitoba Energy and Mines, Geological Services, Report of Field Activities for 1985, and presented at the November 1985 Manitoba Energy and Mines Annual Meeting with Industry. Manuscripts related to this and earlier work are now in preparation for journal publication.

FOLLOW-UP AND IMPLICATIONS:

The present results, combined with those of earlier work, have shown that (based on Rb-Sr isotopic systematics), the Chipewyan batholith in Manitoba shows a marked uniformity, indicating a common origin and synchronous emplacement of all the phases studied. Early granitoids of the Southern Indian domain yield significantly higher Rb-Sr ages. The age of granitoid emplacement may have implications on the timing of mineralization in the Southern Indian domain.

The significantly younger Rb-Sr ages of late-kinematic granites in the Gods Lake subprovince, relative to U-Pb zircon ages, suggest subsolidus element migration through a fluid medium, perhaps responsible for uranium mineralization and emplacement of rare-element pegmatites in the region.

The relocation of the Earth Science Department into a new building caused an interruption of laboratory functions from the end of December 1985 to March 1986.

Besides work to be completed on Molson dyke contact metamorphic rocks, follow-up work at Cross Lake will include dating a muscovite gneiss (Cross Lake tonalite). In order to better establish the temporal relationship between possible Archean layered gneiss and suspected late Aphebian plutonism, four rock units from the Superior-Churchill boundary zone (including a layered gneiss and the Fox Lake granite from the Split Lake block) will be analyzed. The age of a pegmatite-intruded shear zone will restrain the age of late faulting in the Thompson Nickel Belt (a possible control on late-stage mineralization).

PROJECT 2.1: Mineral occurrences documentation, Lynn Lake area

INVESTIGATOR: D.A. Baldwin

OBJECTIVES:

To document and classify known mineral occurrences in the Lynn Lake area, as a basis for delineating regional metallotects and to locate and document mineral occurrences not previously described. The resultant data will focus private sector exploration activities into favourable geological settings thereby increasing the effectiveness of mineral exploration activities in the search for base and precious metal deposits.

PROGRESS:

Documentation and classification of mineral occurrences in the Lynn Lake area are completed. Preparation of mineral deposit maps is in progress. The data have been collated into mineral deposit files that are available for inspection by representatives of the private sector. Assay results from bedrock samples have outlined laterally continuous stratigraphic sequences that contain anomalous gold values.

PRODUCTS:

Preliminary results from field investigations have been included in the 1984 and 1985 Reports of Field Activities.

FOLLOW-UP AND IMPLICATIONS:

Preliminary mineral deposit maps for NTS 64C/11, 12, 14 and 15 are in preparation and 64C/11 is near completion. The mineral deposit maps and site specific data for the mineral occurrences will form the basis of a forthcoming report on the geology of mineral occurrences in the Lynn Lake area.

The results of this project resulted in the formulation of Projects 2.2 and 2.29 to investigate the stratigraphic control for gold mineralization in selected areas in the Lynn Lake area.

PROJECT 2.4: **Rock geochemistry, biogeochemistry and stratigraphy of the Agassiz Metallotect**

INVESTIGATOR: M.A.F. Fedikow

OBJECTIVES:

To examine the feasibility of using detailed and regional biogeochemical surveys to establish mineral exploration targets in the Lynn Lake area.

To determine whether the trace element content of peat bogs can be used as an indicator to locate "blind" gold mineralization along the Agassiz Metallotect.

To map in detail the stratigraphy of known gold occurrences along the Agassiz Metallotect.

PROGRESS:

The feasibility of detailed biogeochemical surveys has been addressed in OF84-1 and 85-6. The geology of the MacLellan (Agassiz) deposit has been described in OF85-5. Additionally, the application of mercury-gas surveys to the search for gold along the Metallotect has been attempted and reported on in OF85-11.

A report describing rock geochemical techniques used to distinguish gold-bearing from barren rocks along the Agassiz Metallotect is in preparation.

PRODUCTS:

The results of this program are being released as open file reports as preliminary and final interpretations become available. Detailed stratigraphic sections and results of peat bog geochemical studies are being prepared.

FOLLOW-UP AND IMPLICATIONS:

Recent discoveries of gold mineralization along the Agassiz Metallotect as well as the presence of the MacLellan Mine indicate enormous potential in base rocks for repetitions of Agassiz-type or other styles of gold mineralization. Stratigraphic and geochemical studies are planned along the entire Metallotect in an attempt to identify more localized zones of higher gold potential.

PROJECT 2.5: **Industrial Minerals Evaluation, Lynn Lake area**

INVESTIGATORS: R. Gunter and P. Yamada

OBJECTIVES:

To evaluate reported occurrences of sillimanite, garnet, building stone and other industrial minerals in the Lynn Lake area. The deposits will be sampled to determine the suitability of the material for industrial mineral use. Detailed mapping, sampling and possible diamond drilling will be conducted on those deposits considered to be geologically favourable.

PROGRESS:

Property evaluations in the Lynn Lake-Thompson region have been undertaken on (1) garnet-anthophyllite units in the Lynn Lake area; (2) cordierite in the Nelson House area; and (3) soapstone and marble in the Thompson area. These assessments are of a preliminary nature and are to be continued in more detail in 1986/87.

PRODUCTS:

Preliminary reports (GS-9 and GS-37) in the 1985 Report of Field Activities describe the findings in the Lynn Lake and Thompson areas. The value of industrial minerals as a mineral commodity has been communicated to geologists working in private industry. Several inquiries from the public have been received concerning cordierite from Nelson House as a possible gemstone, and soapstone and marble from Pipe Lake Open Pit as possible carving and facing stone.

Initial results warrant continuation of this project.

FOLLOW-UP AND IMPLICATIONS:

The detailed study of the Nelson House cordierite and the Thompson soapstone and marble occurrences will be continued in 1986/87. These studies are designed to quantify the volume of material present and to bulk sample the marble for quality testing, i.e. strength and resistance to abrasion. The Ruttan Mine will be examined to determine if any potential for industrial minerals exists.

PROJECT 2.6.2: Lar Deposit Alteration

INVESTIGATORS: S. Elliot, E.C. Appleyard* and G.H. Gale

OBJECTIVES:

To document the nature and extent of alteration around the Lar Deposit and to establish geochemical parameters for distinguishing alteration zones.

PROGRESS:

Field investigations and analytical work are complete. A 1:10 000 geology map of the deposit area has been prepared and the manuscript of an M.Sc. thesis by S. Elliot is nearing completion.

PRODUCTS:

Reports of field investigations and analytical results are contained in the 1984 and 1985 Reports of Field Activities. Expected completion date of the thesis is July 1986.

FOLLOW-UP AND IMPLICATIONS:

This project will attempt to establish geochemical patterns that will aid in distinguishing alteration zones associated with concentrations of base metal sulphides in the Lynn Lake area as an aid to future exploration activities.

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*University of Waterloo

PROJECT 2.6.3: **Cartwright Lake Gold, Lynn Lake**

INVESTIGATORS:

D. Peck, T.E. Smith*, and D.A. Baldwin

OBJECTIVES:

To locate, describe and determine the mode of occurrence and origin of gold mineralization in the Cartwright Lake area as an aid to future exploration in the area.

PROGRESS:

Field investigations and analytical work are complete. The manuscript for an M.Sc. thesis by D. Beck is nearing completion.

PRODUCTS:

Reports of field investigations and preliminary analytical data are included in the 1984 and 1985 Reports of Field Activities. Expected completion date of the thesis is June, 1986.

FOLLOW-UP AND IMPLICATIONS:

The results of this project are in part responsible for the formulation of Project 2.2, and will assist in the evaluation of the mineral potential of gold mineralization on the "Johnson Shear Zone" in the southern part of the Lynn Lake volcanic belt.

*University of Windsor

PROJECT 2.22: **Mineral Occurrences, Barrington Lake Area**

INVESTIGATORS: D.A. Baldwin and D. Parbery

OBJECTIVES:

To document and classify mineral occurrences in the Barrington Lake area, in order to delineate geological settings likely to contain economic concentrations of base and precious metals (metallotects). The resultant data will focus private sector exploration activities into favourable geological settings thereby increasing the effectiveness of the search for base and precious metal deposits.

PROGRESS:

The documentation and classification of the mineral occurrences and assay and trace element analyses are complete. Data have been collated in the form of mineral deposit files that are available for public examination. A preliminary mineral deposit map for NTS 64C/16 is in preparation.

PRODUCTS:

Preliminary results from field investigations have been included in the 1985 Report of Field Activities.

FOLLOW-UP AND IMPLICATIONS:

The mineral deposit map and data contained in the mineral occurrence files will be included in a forthcoming report on the geology of mineral occurrences in the Lynn Lake area.

PROJECT 2.27: **Remote Sensing: Agassiz Metallotect**

INVESTIGATORS: M.A.F. Fedikow
D.T. Anderson (University of Manitoba)

OBJECTIVES:

To identify potential ore deposits buried beneath superficial clay deposits. Remote sensing techniques, using MEIS II and MSS spectral scanners, will determine if airborne detection of vegetation stress can be used to identify buried precious or base metal mineralization. The entire region underlain by the Agassiz Metallotect is to be investigated.

PROGRESS:

Set-up of the Image Analysis System at the University of Manitoba has been delayed due to the move of the Department of Earth Sciences to a new building. Nevertheless, four students are currently undertaking studies related to the integration of multispectral remote sensing and geological data. The results of these studies will be presented as papers in Reno, Navada 1986.

As part of the Agassiz Metallotect Remote Sensing project detailed bedrock geology, surficial geology, vegetation distribution, INPUT electromagnetic data, and vertical field gradiometer data are currently being digitized. These data will be integrated with multispectral MEIS II data when the Canada Centre for Remote Sensing flies the Agassiz Metallotect this summer.

PRODUCT:

Hard data tapes containing raw data from remote sensing.

FOLLOW-UP AND IMPLICATIONS:

1. Airborne Survey of the Agassiz Metallotect by the Canada Centre for Remote Sensing.
2. Acquisition of the data tapes.
3. Merging remote sensing data with digitized geological, geophysical and geochemical data.

In 1986-87 the project is to be coordinated and funded by the GSC as Project C.2.1.3.

PROJECT 4.1: **Ruttan, Le Clair Lake**
4.3: **Agassiz Metallotect**
4.4: **Flin Flon**

INVESTIGATOR: Erik Nielsen

OBJECTIVES:

To continue the evaluation of till geochemistry as a method of exploration for base and precious metals. Case studies of glacial dispersion are implemented in and adjacent to known mineral occurrences. In addition, till geochemical anomalies are mapped in selected areas of little or no outcrop to aid in the search for mineralization.

PROGRESS:

In 1985 till sampling was conducted along the Agassiz Metallotect between the MacLellan Mine and Nickel Lake (4.3). Samples were collected from 810 hand-dug holes. Many samples were anomalous in gold and the samples from Nickel Lake were unexpectedly anomalous in arsenic.

Investigations at Ruttan similarly revealed an extensive arsenic anomaly. Visible gold was found in one sample from Le Clair Lake and several samples were geochemically anomalous in gold and arsenic.

The work in the Flin Flon area has been halted. The area worked in last year had too much outcrop for till geochemistry to be worthwhile and the results of arsenic analysis on the less than 2 micron fraction indicated that heavy mineral separation and gold analysis were not warranted.

Geochemical analyses are complete but mineralogical and textural investigations are ongoing.

PRODUCTS:

An open file report detailing the data and preliminary results of the work along the Agassiz Metallotect will be available by late May 1986. Summaries of the field work were presented in the Report of Field Activities and at the Meeting with Industry, 1985.

FOLLOW-UP AND IMPLICATIONS:

Arsenic anomalies in both the Nickel Lake and Ruttan area will be investigated further in the 1986 field season.

The Ruttan till samples will be analyzed for gold and arsenic. The most likely source for the arsenic in the till is mineralization along the Vol fault, located less than a quarter of a kilometre north of the area sampled last year.

The sampling at Nickel Lake will aim at locating the source of the high arsenic anomaly in this area.

There will be no follow-up in the Le Clair Lake area.

The results of the till geochemistry from Nickel Lake presented at the Meeting with Industry are being used by Sherritt-Gordon to guide their drilling in that area.

Sherritt is also embarking on an extensive till sampling program (approximately 1,000 samples) in the Lynn Lake area as a direct result of these till geochemical studies.

PROJECT 4.3: Basal Till Investigation - Agassiz Metallotect, Lynn Lake

INVESTIGATORS: M.A.F. Fedikow and E. Nielsen

OBJECTIVES:

To evaluate the geochemistry of heavy mineral separates and clay-sized fractions of basal till samples as an exploration method for gold mineralization along the Agassiz Metallotect.

PROGRESS:

Helicopter-supported reconnaissance sampling along the Agassiz Metallotect was completed during this past field season. Heavy mineral separates and gold counts are being completed as is the AAS analysis of the clay-sized fraction.

PRODUCTS:

Preliminary findings are being released as open file reports detailing the results of this program along the 65 km Metallotect. One open file report has already been released (OF85-3) and others are in preparation. Other open file reports examining geochemical exploration methods along the Metallotect include OF84-1, 85-5, 85-6 and 85-11. The remainder of the basal till examinations will also be released as open file reports.

FOLLOW-UP AND IMPLICATIONS:

The recognition of 65 km of gold-bearing rocks required a thorough evaluation of this stratigraphy for structural repetitions of the target formations. The presence of the Dot Lake and the soon-to-be producing MacLellan Mine indicate significant concentrations of gold exist in these rocks. The recent discovery of significant gold mineralization at Farley Lake 45 km east of the MacLellan Mine within the Agassiz Metallotect is further testimony to the need for ongoing studies.

PROJECT 5.1: 1:250 000 Synoptic Geological Compilation (64B, 64C)

INVESTIGATORS:

H.V. Zwanzig, S. Parker et al.

OBJECTIVES:

Under the compilation program all available geological data for the Lynn Lake and Ruttan areas will be synthesized and plotted at a scale of 1:250 000. The main objective is to produce a coherent, large-scale map from the numerous available geological maps at their various scales and levels of complexity. This map will provide a regional perspective of the geology for mineral exploration.

PROGRESS:

Systematic guidelines were prepared under which NTS 64C was redrafted and 64B was drafted as rough-copy maps. Marginal notes were prepared, describing stratigraphy, structure, zircon ages and important mineral deposits. Drafting and printing were completed for 64B and nearly completed for 64C.

PRODUCTS:

Map 64B is printed; 64C is expected to be ready by September 1986.

FOLLOW-UP AND IMPLICATIONS:

Standardized conventions and techniques have been established to prepare future maps in the series; 53L is now underway, and will be completed by calendar year end.

Marginal notes provide a simple geological history for the Lynn Lake-Ruttan region.

PROJECT 5.3: **Lynn Lake Report and Maps**

INVESTIGATOR: H.V. Zwanzig

OBJECTIVES:

Geological maps and technical reports describing the geology and mineral occurrences in the Lynn Lake-Ruttan region are to be prepared in order to aid, and focus mineral exploration in this region.

PROGRESS:

For the Kamuchawie area (64C/5) and for parts of the Kadeniuk area (64C/6) petrographic work was done and compiled for each map unit. A final map was prepared for 64C/5; 64C/6 was revised with a more detailed legend.

PRODUCTS:

Two maps, 64C/5 and 64C/6, are completed in manuscript form and are ready for drafting. A report on the sedimentary rocks in the Lynn Lake area is in preparation.

FOLLOW-UP AND IMPLICATIONS:

Reports describing the structure and zircon geochemistry for the Lynn Lake area and describing geology between Kamuchawie and Granville Lakes are to be completed in 1987.

GEOLOGICAL SURVEY OF CANADA

PROJECT C.1.1.2: **Metamorphism in the Lynn Lake-Laurie Lake area**

INVESTIGATOR: GSC/PreC - T.M. Gordon

OBJECTIVES:

To elucidate the metamorphic history of rocks on the southern flank of the Lynn Lake greenstone belt. Thesis study of mineral assemblages and mineral compositions in pelitic and mafic rocks of the Wasekwan Group to document the chemical and mineralogical changes and pressure-temperature conditions during metamorphism.

PROGRESS:

a) Three months of field work by S.L. Jackson have demonstrated that the transition between the Lynn Lake Belt and the Kisseynew belt is structurally complex and that metamorphic isograds do not have a simple pattern. Formation of sillimanite-quartz knots (faserkiesel) and the decomposition and retrograde growth of white mica are being studied to determine pressure-temperature-time paths.
b) Five pressure temperature determinations based on mineral compositions indicate that low pressure (4 kb) conditions prevailed during metamorphism and that peak temperatures increase from northeast to southwest.

The boundary between the Lynn Lake volcanic belt and Kisseynew gneiss belt to the south is gradational, essentially marked by an isograd.

PRODUCTS:

Poster session at the Manitoba Energy and Mines Annual Meeting with Industry.

Paper to be published in Current Research Paper 86-1B.

FOLLOW-UP AND IMPLICATIONS:

Studies will be continued by S. Jackson (Queen's U.) which include detailed mapping in the vicinity of Laurie Lake and the Fox Mine. Results will be reported in Current Research 87-1B. Presentation at FONB sponsored workshop in April, Winnipeg.

Exploration companies are interested whether supracrustal rocks of the Lynn Lake volcanic belt extend into the Kisseynew gneiss belt, where they would be of prospecting interest even though metamorphosed to a higher grade. There is also interest in alteration zones metamorphosed to different metamorphic grades.

PROJECT C.2.2.2: **Northern Churchill-Metallogeny of mafic-ultramafic rocks**

INVESTIGATOR: GSC/EGM - L.J. Hulbert

OBJECTIVES:

To characterize mafic-ultramafic bodies with emphasis on their potential for magmatic sulphide (Ni-Cu-PGE) and oxide (Cr-Ti-V) deposits. One component will provide data on the platinum metal concentrations in known mineralization. Another will document the character of some of the mineralized mafic-ultramafic bodies. This will include studies by GSC permanent staff (L.J. Hulbert) as well as thesis research carried out under contract.

PROGRESS:

a) Three intrusions in the Lynn Lake area were investigated. They are the:

1. Cartwright Lake Intrusion
2. Norrie Lake Intrusion
3. Black Trout Lake Intrusion

The Cartwright and Norrie Lake bodies were examined and sampled for their PGE potential. A variety of both magmatic and hydrothermal mineralization was investigated at Black Trout Lake for precious metals. Samples from these bodies were prepared for major, trace, precious metal, REE, sulphur and radiogenic isotope analysis.

b) The Cartwright Lake and Norrie Lake bodies appear to be of a different age and yet are spatially closely related. Detailed surface mapping revealed that a geophysical I.P. anomaly is due to a previously unrecognized cyclic unit with sparse disseminated sulphides. Sulphur isotope studies of country rock in the Lynn Lake intrusion show that $^{34}\delta S$ will not be diagnostic for determining the source of sulphur in the Ni-Cu ores. An oxygen isotope traverse across the intrusive contact and through the "NIW" orebody revealed that no significant hydrothermal exchange occurred between intrusion and country rock. Compelling petrological, chemical and structural evidence now indicates that the intrusion is a complex made up of three separate intrusions, successively gabbro, more primitive norite. and ultramafic. The Ni-Cu ores are related to the latter two.

FOLLOW-UP AND IMPLICATIONS:

- Field work will involve investigation of the Black Trout Lake, Tow Lake, Granville Lake, Pool Lake and Snake Lake intrusions.
- Laboratory investigations of the Lynn Lake, Fraser Lake and Cartwright Lake intrusions will continue.

Much interest has been shown by industry in relation to the Ni-Cu/intrusion relationships. Examination of mafic-ultramafic intrusions in the Lynn Lake-Kisseynew regions has allowed industry to re-evaluate exploration plans; it would appear that the PGE potential of these intrusions is not as great as those examined elsewhere in the province. This observation by L. Hulbert has saved exploration companies time and money.

PROJECT C.4.1.2: Glacial prospecting

INVESTIGATORS: GSC/TS - R.N.W. DiLabio, C.A. Kaszycki

OBJECTIVES:

Regional mapping of surficial deposits at 1:100K scale, and systematic till sampling of the same areas for geochemical mapping. The work will be done in several different contiguous map areas over the life of the agreement.

84/85 - South 1/2 Granville Lake (64C), Brochet (64F)
85/86 - Big Sand (64G), North 1/2 Uhlman Lake (64B)
86/87 - Kississing Lake (63N)
87/88 - South 1/2 Uhlman Lake (64B), W 1/2 Sipiwesk (63P), Nelson House (63-O)
88/89 Final laboratory work and write-up

PROGRESS:

a) Helicopter-supported field work was carried out over a 10 week period extending from June 15 to August 24. Regional till sampling was completed on 64G (Big Sand) and N1/2 64B (Uhlman Lake) and a total of 400 till samples collected. Preliminary airphoto interpretation and field checking in these areas were also carried out. Final airphoto interpretation and drafting of surficial geology for 64F were completed. Report of till geochemistry data for 64C was published as GSC Open File 1204, and open file for NTS 64F is in preparation.

Surficial geology map at 1:125K scale for 64C was published as GSC Open File 1258.

Sample preparation and geochemical analysis of regional samples are being carried out, as are airphoto interpretation and surficial mapping of 64G and 64B.

b) The Leaf Rapids Interlobate Moraine has been identified as the all-time western limit of Hudson Bay ice in this part of Manitoba. It marks the late-glacial position of the suture between Hudson (eastern) and Keewatin (northern) ice. Tills on the respective sides of the moraine are predictably different in lithology and ice-flow history.

The geochemistry of till in 64C and 64F, both west of the moraine, reflect Keewatin provenance as well as local bedrock geology, e.g. the Lynn Lake metavolcanic belt. A large dispersal train south of Granville Lake appears to originate at small mineralized, metavolcanic lenses that carry As, Au, Cu, and Zn. This train will be studied in 1986.

PRODUCTS:

Poster display on these findings was presented at the Manitoba Energy and Mines Annual Meeting with Industry, the GSC Current Activities Forum, and the Prospectors and Developers Association annual meeting. The results were also presented in a talk at the GSC Forum (see 4.1.4).

FOLLOW-UP AND IMPLICATIONS:

Regional till sampling and surficial mapping of NTS 63N, 63K (north 1/2), 630 (west 1/2), and 64B (south 1/2); follow up work in 63C and 63N on large dispersal train, plus contract for study of till samples from this area; gold analyses of archived samples from parts of 64G, 64C, and 64B; seismic surveys in the Thompson area along a line towards Gillam to guide drilling in 1987; contracted out air photo interpretation of 64B, 64N, 63K (N 1/2), and 630 (W 1/2).

- Till geochemistry of 64C, GSC Open File 1204, has been consulted by industry staff in Manitoba D.E.M. offices in Winnipeg. That office can produce copies on request.
- Poster display seemed to be well received at its venues, but no obvious responses were made.
- Copies of Open File 1204 and 1258 were sent to Dr. Nils Bertil Svensson of Norrlandsfonden, Lulea, Sweden, in response to his request for information regarding specific poster displays presented at the GSC Forum in January 1986.

PROJECT C.4.1.4: Quaternary geochemistry

INVESTIGATORS: GSC/TS - R.N.W. DiLabio
C.A. Kaszycki

OBJECTIVES:

To estimate the influence of glacial Lake Agassiz clays on the geochemistry of recent lake sediments.

PROGRESS:

a) Approximately 400 till samples from 64C and 64F resubmitted for gold analysis. Field work for the Granville Lake test study was completed concurrent with 4.1.2, regional sampling in the Leaf Rapids area. Approximately 75 regional samples of Lake Agassiz clay were collected. Six lakes, from a variety of surficial settings containing modern lake sediments that cover a wide range of trace element levels, were studied in detail by means of sonal profiling, coring and detailed sampling of their drainage basins. All samples have been prepared and submitted for geochemical analysis. Detailed work on the cores continues.

b) This work shows that even lakes that have very little Lake Agassiz clay around their shorelines are nevertheless floored with Lake Agassiz clay and that Lake Agassiz clay is being recycled into the modern lakes. Lake Agassiz clay is regionally uniform geochemically and contains significant amounts of smectites and carbonates derived from exotic sources, the Mesozoic shales of the Prairies and the Paleozoic carbonates of the Hudson Bay basin, respectively. In the area of heavy to moderate clay cover, modern lake sediments better reflect the geochemistry of the Lake Agassiz clays than they reflect the geochemistry of till or bedrock.

PRODUCTS:

Kaszycki and DiLabio presented a talk at the GSC Current Activities Forum; the talk was well received by several explorationists.

FOLLOW-UP AND IMPLICATIONS:

- Contracted out deep coring of 2 or 3 lakes to assess vertical variations in geochemistry and possible vertical pathways for metal migration.
- Analyses of 1985 and 1986 cores by geochemistry.
- Re-analysis of samples of surficial sediments from around test lakes.
- Contracted out palynological analysis of cores.

DISTRICT II. FLIN FLON-SNOW LAKE

Summary and Project listing:

During 1985-86 the Provincial Geological Services Branch and Federal Geological Survey mounted numerous mapping programs and other technically specialized minerals investigations aimed at documenting the geological setting of known mineralization, and determining the structural, chemical and genetic controls that resulted in the formation of copper, zinc and gold-bearing orebodies.

Detailed 1:20 000 geological mapping in the Flin Flon, Athapapuskow and Reed Lake areas was initiated in parallel with more regional 1:50 000 mapping, to evaluate potential gold and tungsten metallotects in the region between Kisseynew and File Lakes.

South from Athapapuskow Lake to Hargrave Lake airborne magnetic surveys and scout drilling were used to develop maps of the buried Precambrian Shield enabling industry to explore for and trace mineralized formations beneath the limestone cover rocks south to latitude 54°.

Within the greenstone belt itself, mineral deposit documentation and geochemical surveys focussed on both the copper/zinc and gold deposits in order to develop new exploration techniques and concepts for more widespread application in the region.

In this region and the Lynn Lake district the industrial mineral resources were evaluated to explore the potential for new industries based on abrasives, refractories, building stone, soapstone, and other industrial minerals.

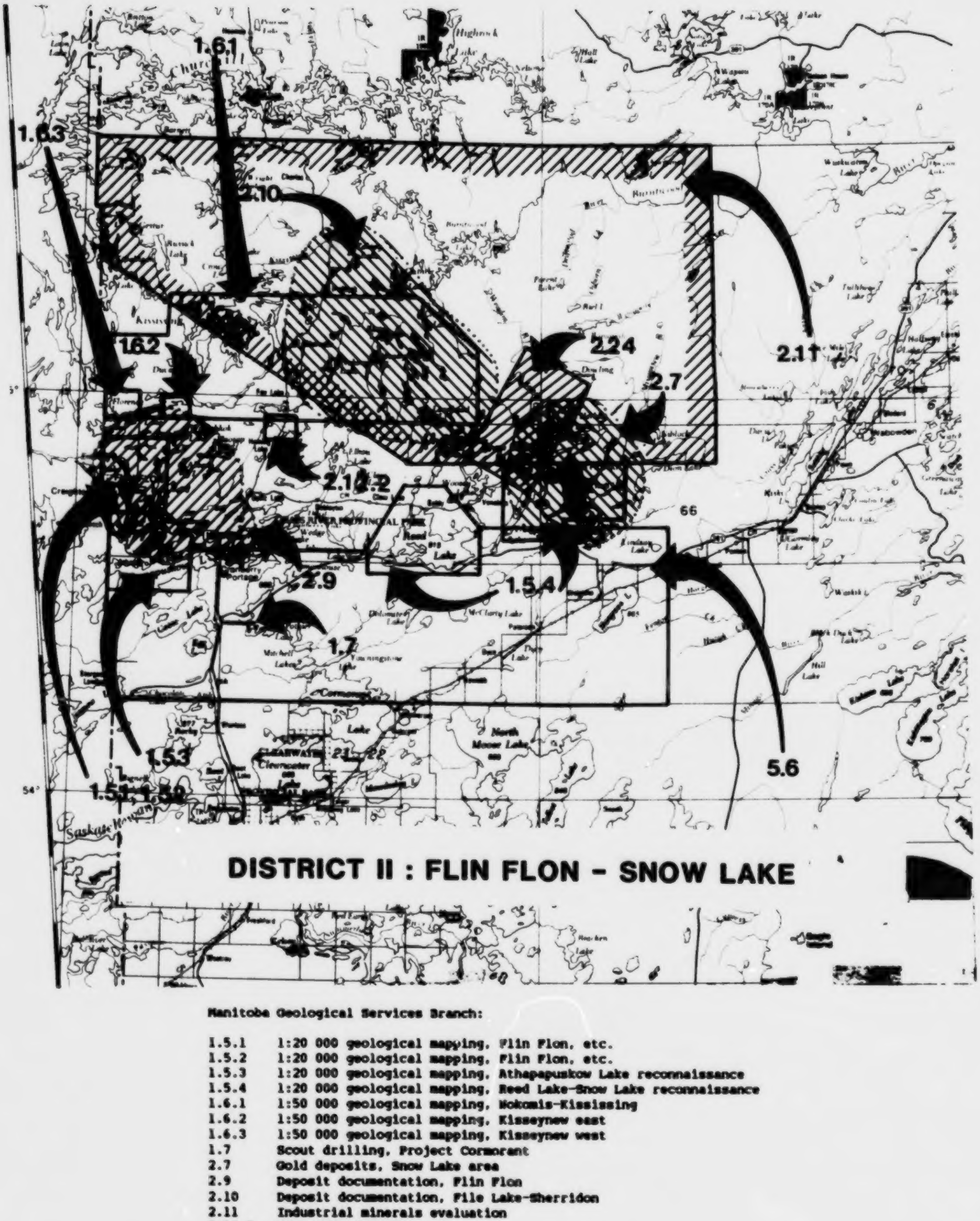
MANITOBA GEOLOGICAL SERVICES BRANCH

PROJECTS 1.5.1 and 1.5.2: 1:20 000 scale geological mapping, Flin Flon area

INVESTIGATORS: A.H. Bailes and E.C. Syme

OBJECTIVES:

The objective of this project is to provide a sound geological data base for future mineral exploration in the Flin Flon base metal (and gold) mining camp. A major goal, in addition to the production of high quality 1:20 000 scale geological maps, is to stratigraphically subdivide the Amisk Group volcanic supracrustal rocks and place mineral deposits within this stratigraphic framework. A further goal is to identify the environmental conditions that existed at the time of mineralization with a view to determining those conditions that were favourable to deposition of the mineral deposits.



Manitoba Geological Services Branch:

1.5.1	1:20 000 geological mapping, Flin Flon, etc.
1.5.2	1:20 000 geological mapping, Flin Flon, etc.
1.5.3	1:20 000 geological mapping, Athapapuskow Lake reconnaissance
1.5.4	1:20 000 geological mapping, Reed Lake-Snow Lake reconnaissance
1.6.1	1:50 000 geological mapping, Nokomis-Kississing
1.6.2	1:50 000 geological mapping, Kisseynew east
1.6.3	1:50 000 geological mapping, Kisseynew west
1.7	Scout drilling, Project Cormorant
2.7	Gold deposits, Snow Lake area
2.9	Deposit documentation, Flin Flon
2.10	Deposit documentation, File Lake-Sherridon
2.11	Industrial minerals evaluation
2.12.2	Vamp Lake deposit
2.24	Copper-zinc deposits, Snow Lake area
5.6	Sub-Paleozoic compilation

Geological Survey of Canada: (not shown)

C.1.1.1	Mineralized alteration zones, southern Churchill Province
C.1.1.3	U-Pb geochronology, Churchill Province
C.1.2.1	Sub-Paleozoic compilation/core drilling
C.2.1.1	Flin Flon-Snow Lake metallogeny
C.2.2.1	Metallogeny of mafic-ultramafic rocks, Flin Flon-Snow Lake area
C.3.1.1	Aeromagnetic gradiometer surveys

Figure 5: Location of MGSB projects (1985)

PROGRESS:

In 1985 all activities were directed towards completing a report and accompanying map. Most of the report is at a first draft stage. The final map is currently being drafted and is scheduled to be printer-ready by September 1986.

PRODUCTS:

No published material was released in 1985. The final report, scheduled for completion in 1987, will contain all the pertinent information and conclusions required by mineral exploration companies.

FOLLOW-UP AND IMPLICATIONS:

Activity in 1986/87 will be directed entirely towards preparation of a final map and report on the Flin Flon-White Lake area. This map and report will provide a significant upgrading of the geological data base for the Flin Flon mining camp, such that future exploration in this area can proceed in a rational and productive manner. The stratigraphic subdivisions of Amisk Group volcanic rocks can be extended beyond the immediate map area and should provide a sound basis for future geological projects in the Flin Flon district.

PROJECT 1.5.3: 1:20 000 scale geological mapping, Athapapuskow Lake area

INVESTIGATOR: E.C. Syme

OBJECTIVES:

The primary objective of this project is to provide an updated and detailed geological data base for future base metal and gold exploration in the Flin Flon area. To that end, specific goals include: production of high quality 1:20 000 geological maps, definition of Amisk Group volcanic stratigraphy and its relationship to the stratigraphy now established in the Flin Flon area (Bailes and Syme, in prep.), definition of stratigraphic and structural setting of mineral occurrences, definition and extension of the major faults and folds which dominate the structure in the Flin Flon area, and geochemistry and geochronology of igneous units.

PROGRESS:

In 1985 one month of fieldwork was conducted to determine the suitability of the area for detailed 1:20 000 geological mapping. The decision was made to proceed with the project in 1986.

PRODUCTS:

Results of the reconnaissance mapping are available in Report of Field Activities 1985 (GS-10: Athapapuskow Lake Project).

FOLLOW-UP AND IMPLICATIONS:

A full field season will be spent mapping in the area in 1986. A preliminary map and report summarizing the summer's findings will be given in the 1986 Report of Field Activities. This project will build upon the stratigraphic and structural base now established in the Flin Flon area (Bailes and Syme, in prep.) to provide a better understanding of the western Flin Flon-Snow Lake metavolcanic belt.

PROJECT 1.5.4: 1:20 000 scale geological mapping, Morgan Lake-Chisel Lake area

INVESTIGATOR: A.H. Bailes

OBJECTIVES:

The objective of this report is to provide a much improved geological data base for future mineral exploration in this base metal- and gold-rich mining district. A major goal is the development of a coherent regional volcanic stratigraphy and the identification of the position of mineral deposits within this stratigraphic framework. A further goal is to document the distribution and main characteristics of hydrothermal alteration zones associated with known and, as yet, undiscovered mineralized zones. Where possible, the environmental conditions that existed at the time of mineralization will be identified with a view to determining those conditions favourable to deposition of mineral deposits.

PROGRESS:

In 1985 a short field season was conducted in the Reed Lake and Morgan Lake-Chisel Lake area to assess the feasibility of starting a 1:20 000 scale mapping program in one of these areas. The Morgan Lake-Chisel Lake area is clearly the most suited to 1:20 000 scale mapping. An area bounded by latitudes 54°45' to 54°50' and longitudes 100°07' to 100°15' is targetted for 1:20 000 scale mapping to begin in the 1986 field season.

Two samples were collected for U-Pb geochronological analysis. These dates will provide constraints on the age of an Amisk synvolcanic intrusion and a late tectonic felsic pluton.

PRODUCTS:

A report summarizing geological investigations in the Reed Lake and Morgan Lake-Chisel Lake area is published in the 1985 Report of Field Activities. This report sets out the main objectives of the 1:20 000 mapping program in the Morgan Lake-Chisel Lake area.

FOLLOW-UP AND IMPLICATIONS:

In 1986, activity in the Morgan Lake-Chisel Lake area will be directed primarily towards geological field work. Demands from other projects will permit only limited follow-up on data and samples collected during the field program. Data will be released through a submission to the 1986 Report of Field Activities and a preliminary map.

Mapping in the Morgan Lake-Chisel Lake area will significantly upgrade the existing geological data base, such that future exploration in this area can proceed in a rational and productive manner.

PROJECT 1.6.1: 1:50 000 scale geological mapping of the Kississing Lake area

INVESTIGATOR: D.C.P. Schledewitz

OBJECTIVES:

The objective is to improve the existing mapping by providing a consistent and sound data base to assist mineral evaluation studies and exploration. A major objective is to delineate, in detail, the variations and lithologic relationships with rocks of the past base metal-producing Sherridon map area to the east.

PROGRESS:

Fieldwork was initiated in the northeast corner of the Kississing Lake area in 1985. This locale was chosen because of a well exposed, well defined structure, centered on Big Island, which provided a cross section of lithologies on its flanks. In addition, a number of mineral claims (Yakushavich Island) and numerous trenched mineral showings are indications of ongoing mineral exploration. Mapping indicated the lithologies vary in composition over short distances along and across strike. It became readily apparent that existing 1 mile to 1 inch mapping was generalized and inconsistent. To deal with the lithologic variation, mapping was undertaken at a scale of 1:20 000, where possible, to provide an adequate data base for final maps and report production at 1:50 000 scale.

PRODUCTS:

A preliminary map at 1:20 000 scale covering the Big Island and Yakushavich Island areas and a report were produced as part of the Report of Field Activities, November 1985.

FOLLOW-UP:

Continuation of mapping in 1986 and 1987.

A final map at 1:50 000 scale and a final report dealing with the mineral potential, and lithostratigraphic considerations encompassing aspects of the geology of adjacent areas, including metamorphic, structural and igneous history, is projected for 1989.

IMPLICATIONS:

It remains to be seen whether mineralization on the south flank of Kisseynew domain is stratabound. Preliminary considerations are that stratigraphy is not as continuous as previously assumed. It may be that mineralization is controlled by different stratigraphic sequences which behaved similarly to shearing (thrusting?) and therefore are mineralized rather than being part of the same stratigraphic horizon.

PROJECT 1.6.2: Kisseynew east, geological mapping

INVESTIGATOR: H.V. Zwanzig

OBJECTIVES:

The purpose of this project is to provide structural and stratigraphic control for the base and precious metal deposits in the Kisseynew Lake-Sherridon Lake region of the Kisseynew metasedimentary gneiss belt. The investigation will establish a stratigraphic subdivision of the Sherridon Group, separate the Nokomis Group from the granitoid complexes and trace out the Amisk Group at the margin of the Flin Flon volcanic belt. A major goal is to test whether gold deposits in the area occur consistently along one stratigraphic unit established by the new mapping or whether there is structural control.

PROGRESS:

During the short field season in 1985, mapping was completed in the area covered by Preliminary Map 1984-K1, structural problems were solved and samples were collected for chemical analysis.

An extended field trip was conducted for members of industry and of the Mineral Resources Division. Examinations of gold deposits at Nokomis and Puffy Lakes were important components of the trip.

PRODUCTS:

Chemical data were published in the annual Report of Field Activities (1985). Comments were made on the results of the structural mapping in 1984-K1.

The chemical data are consistent with an earlier conclusion that a significant part of the Sherridon gneisses are metavolcanic rocks north of Weldon Bay.

FOLLOW-UP AND IMPLICATIONS:

The mapping will be continued in 1987. Work will be extended northwest of Puffy Lake. East of the lake work will be extended regionally along the Kisseynew-Flin Flon belt margin.

The two gold deposits in the area do not occur in identical successions although the different rock types could be coeval. Stratigraphic mapping across other deposits will be necessary to see if a metallotect can be established conclusively.

PROJECT 1.6.3: **Kisseynew west**

INVESTIGATOR: W.D. McRitchie

OBJECTIVES:

To establish the stratigraphy, lithology, structure and mineral potential in an area apparently containing stratabound gold mineralization, in support of more effective targetting by mineral exploration.

PROGRESS:

A two-week reconnaissance mapping program between Kisseynew Lake and Saskatchewan-Manitoba border delineated the "Kisseynew Metallotect" between Weasel Bay to Forester Lake.

Alternating belts of quartzofeldspathic and metaturbidite gneiss indicate presence of tight isoclinal folding in which several stratigraphic repetitions were noted.

PRODUCTS:

Preliminary map and report in annual Report of Field Activities (1985).

FOLLOW-UP AND IMPLICATIONS:

Dome and basin structures to be mapped in detail during 1986.

Sulphide mineralization confirmed in association with key amphibolite units; newly recognized uranium-bearing pegmatites, contiguous with those in Saskatchewan, may define a separate metallogenic domain.

PROJECT 1.7: **Scout drilling, Project Cormorant area**

INVESTIGATORS: H.R. McCabe, W. Weber, W.D. McRitchie, I. Hosain and D. Berk

OBJECTIVES:

To assist in determining the geology of the Precambrian basement in an area of thin Phanerozoic sedimentary cover, by means of an in-house diamond drilling core hole program. This program is designed to ground-truth geophysical signatures detected by the airborne gradiometer surveys of the Cormorant area.

PROGRESS:

During the 1985 field season, a three-man drill crew, using a truck mounted JKS-300 diamond drill rig, completed a total of 16 holes to Precambrian basement, on targets defined on the basis of airborne gradiometer maps. Prior to drilling, detailed ground magnetometer profiles were run at each site to determine the precise core hole location. Total drilling amounted to 876 m. Average depth to Precambrian basement was 40 m, and total Precambrian drilled was 273 m, an average of approximately 20 m per hole.

PRODUCTS:

All core has been placed on open file in the Department's core and sample library, and preliminary results of the drilling published in the 1985 Report of Field Activities. Petrographic slides and cores are available for examination on request.

FOLLOW-UP AND IMPLICATIONS:

Drilling of the 8 remaining road-accessible targets outlined in 1985 will be continued in 1986. Additional drill targets will be determined on the basis of the geological compilation report presently being compiled by TAIGA Consultants.

PROJECT 2.7: **Gold deposits, Snow Lake area**

INVESTIGATOR: M.A.F. Fedikow

OBJECTIVES:

To determine the geological controls of gold deposits in the Snow Lake area.

To establish the nature and genesis of those gold deposits and investigate possible exploration methodology for detecting similar types of gold mineralization.

PROGRESS:

The preliminary examination of virtually all gold occurrences in the Snow Lake area will be completed by the end of the 1986 field season. In the following two years it is expected that more detailed studies on selected gold occurrences will be commenced.

PRODUCTS:

The preliminary findings stemming from field examinations in 1984 and 1985 are presented in the Report of Field Activities for these years. Detailed occurrence locations, geological maps and assay and geochemical results are available for inspection in a mineral deposit open file.

FOLLOW-UP AND IMPLICATIONS:

Detailed mineral occurrence studies on specific occurrences will commence with the completion of preliminary examinations in 1986. Progress reports describing the new findings will be released in the Report of Field Activities and in open file reports so that mining and exploration companies will be able to utilize relevant mineral occurrence information.

PROJECT 2.9: Mineral occurrence documentation - Flin Flon area

INVESTIGATOR: G.H. Gale

OBJECTIVES:

This project is designed to provide detailed geological maps and descriptions of all known mineral occurrences in the Flin Flon area, provide a genetic classification of deposits and delineate geologically favourable mineralized zones on 1:50 000 scale and 1:20 000 scale maps for further investigations.

PROGRESS:

Over 95% of the mineral occurrences in the 63K/11, 63K/12, 63K/13 and 63K/14 map sheets have been investigated in a preliminary manner with documentation of basic rock types and mineral deposit features. The project progressed to Phase II in 1985 with initiation of detailed studies of specific deposits involving 4-5 weeks or more of field work on each deposit as warranted.

PRODUCTS:

Annual Reports of Field Activities in 1984 and 1985 provide brief descriptions of individual properties. An active mineral deposit file for each occurrence contains detailed geological maps, accurate locations and assay and rock geochemical data.

FOLLOW-UP AND IMPLICATIONS:

At the end of the 1986 field season all of the known mineral occurrences will have been studied. Investigations of specific deposits will continue for several years as new geological problems are identified. This work will entail detailed mapping at scales of 1:1000 and 1:5000. It is anticipated that each major deposit study, i.e. 1:5000 scale studies such as the Tartan Lake investigation, will result in an open file report as soon as the data are available to ensure quick release to the mining and exploration community.

PROJECT 2.10: File Lake-Sherridon area

INVESTIGATOR: G. Ostry

OBJECTIVES:

To provide a mineral deposit data base, identify geological factors controlling mineralization, and classify mineral occurrences into genetic types.

To establish the stratigraphic position of mineralization and determine stratigraphy on the southern flank of the Kisseynew sedimentary gneiss terrain.

To identify specific Metallotects for further investigations.

PROGRESS:

Mineral deposit documentation has been completed in the File Lake area of the Flin Flon-Snow Lake greenstone belt. Mineral deposit maps for the File Lake area are in preparation.

Detailed 1:5000 scale mapping of areas in and around the known gold occurrences was completed at Wood Lake and Evans Lake. A lithogeochemical sampling program was carried out at Evans Lake and at Nokomis Lake. The 62N/2 NTS sheet was reconnoitered to outline areas for future detailed mapping, lithogeochemical studies and mineral deposit documentation.

PRODUCTS:

Report GS-14 in the 1984 Report of Field Activities describes mineral occurrences documented in the File Lake area of the Flin Flon-Snow Lake greenstone belt. Report GS-19 in the 1985 Report of Field Activities describes the mineral occurrences documented in the North Star Lake area of the Flin Flon-Snow greenstone belt. Individual files have been produced for each occurrence documented with detailed maps (where warranted), assay/geochemical results, and written descriptions.

Report GS-18 in the 1984 Report of Field Activities describes stratabound gold mineralization on the southern flank of the Kisseynew sedimentary gneiss terrain at Nokomis, Puffy, Evans and Squall Lakes.

Report GS-15 in the 1985 Report of Field Activities describes stratabound gold mineralization on the southern flank of the Kisseynew sedimentary gneiss terrain at Nokomis Lake and Evans Lake. Preliminary Map 1985 MI-2 describes the host stratigraphy in and around the Evans Lake gold occurrence.

FOLLOW-UP AND IMPLICATIONS:

Further detailed mapping will be carried out in selected areas to define the overall stratigraphy on the southern flank of the Kisseynew sedimentary gneiss terrain and the position(s) of mineralization within that stratigraphy. Thin section work and lithogeochemical sampling will continue to classify the rock types encountered and, in particular, the amphibolites which appear to be spatially related to the known mineralization. Both laboratory and field data will be synthesized to develop genetic models for the Kisseynew-type stratabound precious and base metal mineralization. Effective mineral exploration techniques for precious and base metal mineralization will evolve from the development of these genetic models and an understanding of the factors controlling the mineralization on the southern flank of the Kisseynew sedimentary gneiss terrain.

PROJECT 2.11: Industrial minerals investigations, Flin Flon-Snow Lake region

INVESTIGATORS: R. Gunter and P. Yamada

OBJECTIVES:

The purpose of this project is to evaluate reported occurrences of sillimanite, garnet, building stone and other industrial mineral commodities in the Flin Flon-Snow Lake area. The deposits will be sampled to determine the suitability of the material for industrial mineral use, and those deposits indicating potential will be examined in more detail. Additional examinations will take the form of detailed mapping, sampling and possible diamond drilling.

PROGRESS:

Property evaluations in the Flin Flon-Snow Lake region have been undertaken on: (1) garnet-anthophyllite units at Star Lake-Elken Lake; (2) kyanite and staurolite units in the Snow Lake area; (3) dolomite deposits in the Ponton-Wekusko area; and (4) other minor reported occurrences.

PRODUCTS:

A preliminary report (GS-21) in the 1985 Report of Field Activities describes the findings in the Flin Flon-Snow Lake area. A second product is an increased awareness of the value of industrial minerals among the geologists of the region. Several inquiries from the public have been received concerning dolomite from Ponton as a carving stone, garnet from Star Lake-Elken Lake for water filtration, and Sherridon amazonite as an ornamental stone.

Initial results warrant continuation of this project.

FOLLOW-UP AND IMPLICATIONS:

A detailed study of kaolinite occurrences and the study of dolomite deposits in the Ponton area will be completed. A detailed study of the garnet-anthophyllite unit at Star Lake-Elken Lake, including partial supervision of an M.Sc. thesis, will be undertaken. A preliminary study of the talc occurrence at Iskwasum Lake will be commenced.

PROJECT 2.12.2: Geological setting, Vamp Lake deposit

INVESTIGATORS: P. Laznicka, R. Wadien (G.H. Gale)

OBJECTIVES:

To provide a detailed geological description and interpretation of the gold-bearing massive sulphide deposit at Vamp Lake.

PROGRESS:

Geological mapping at 1:10 000 of the general area was completed in 1985. Portions of the area were mapped at 1:100 scale. Twenty drill holes were logged and sampled for geochemical purposes. Approximately 60 samples were forwarded for analyses by the student undertaking the thesis work (Wadien).

PRODUCTS:

- Geological mapping at 1:10 000 scale.
- Report of Field Activities describing the general geology of the area.
- Sixty (60) major and trace element analyses.
- Year-end technical report is in preparation but has not been reviewed to date.

FOLLOW-UP AND IMPLICATIONS:

A further 2-3 week field study is anticipated for late summer 1986. Petrographic and geochemical interpretations will be conducted during the summer of 1986. Initial results indicate a complex geological history for this deposit. M.Sc. thesis completion is expected in 1987. Project may require additional funds up to $5,000 in 1987.

PROJECT 2.24: Copper-zinc deposits, Snow Lake area

INVESTIGATOR: M.A.F. Fedikow

OBJECTIVES:

To ascertain stratigraphic and structural controls of rock sequences hosting known copper-zinc deposits in the Snow Lake area.

To establish the nature and genesis of those copper-zinc deposits and investigate possible exploration methodology for detecting previously unknown copper-zinc mineralization.

PROGRESS:

Mineral deposit documentation is ongoing in the Snow Lake area of the Flin Flon-Snow Lake greenstone belt.

PRODUCTS:

Mineral deposit maps for the Snow Lake area are in preparation.

Detailed geological mapping and geochemical sampling have been undertaken in the vicinity of most of the occurrences examined to date. An extensive geochemical data base is being developed for these occurrences and includes assay and geochemical analyses from the mineralized zones and host rock sequences. A regional rock geochemical sampling program will be continued and is designed to determine background geochemical concentrations of a wide range of trace elements in major lithologies of the area.

Preliminary findings have been described in the 1984 and 1985 Reports of Field Activities. A mineral deposit open file is available for inspection and contains the location of each mineral occurrence plotted on an air photo. Accompanying detailed sketch maps and assay results complete the file to date.

FOLLOW-UP AND IMPLICATIONS:

The end of the 1986 field season will result in the majority of the mineral occurrences in the Snow Lake area having been examined in a preliminary manner. More detailed examinations of mineral occurrences are expected to continue for several years in an attempt to define Metallotects. As these detailed projects evolve, findings will be released in the form of open file reports, including any detailed mapping, so that mining and exploration companies will have quick access to relevant, up-to-date information.

PROJECT 5.6: **Sub-Paleozoic compilation - Project Cormorant**

INVESTIGATORS: I. Hosain, W.D. McRitchie, W. Weber, in cooperation with the Geological Survey of Canada

OBJECTIVES:

To collate and compile geological and mineral exploration data from Precambrian basement covered by younger Paleozoic limestones, south of Flin Flon and Snow Lake.

PROGRESS:

Scout drilling continued (MGSB Project 1.7), airborne gradiometer coverage was increased. The GSC has awarded a contract to Taiga consultants to compile all company drill hole data and merge them with other geological and geophysical data.

PRODUCTS:

Drill hole data and interpretation in Report of Field Activities 1985.

FOLLOW-UP AND IMPLICATIONS:

- Continuation of scout drilling.
- Geochemical investigations of Namew Lake ultramafics.
- U-Pb geochronology of drill core, where possible.
- Extensive drilling to be financed by the GSC.

Activities will generate a comprehensive data base for compilation of the basement geology.

GEOLOGICAL SURVEY OF CANADA

PROJECT: C.1.1.1: **Mineralized alteration zones, Southern Churchill Province**

INVESTIGATOR: GSC/PreC - E. Froese

OBJECTIVES:

To obtain a description of the mineralogy of hydrothermal alteration zones associated with metamorphosed massive sulphide deposits; suitable as graduate thesis work; involves an increasing laboratory component to 1988.

PROGRESS:

a) E. Froese examined surface exposures and drill core from the Wolverton alteration zone in the Snow Lake area. This zone, on strike with the Wim deposit, is noted for some sulphide mineralization and for a variety of alteration types ranging in composition from ferromagnesian (cordierite-anthophyllite) to aluminous (cordierite-sillimanite).

B.A. Barham, a graduate student at Carleton University, mapped the New Fox alteration zone in the Lynn Lake area. This zone displays the transition from mafic volcanic rock to cummingtonite-garnet rock and eventually cordierite-anthophyllite rock in well exposed, clean outcrops.

b) The recognition of cordierite-anthophyllite rocks and related rocks as metamorphosed alteration zones makes it possible to deduce their precursors - various alteration types (aluminous, potassic, ferromagnesian) associated with volcanogenic sulphide deposits.

PRODUCTS:

Poster sessions at the Manitoba Energy and Mines Annual Meeting with Industry on the New Fox alteration zone (Lynn Lake) and the Osborne Lake mine (Snow Lake). Paper to be published in Current Research Paper 86-1B.

FOLLOW-UP AND IMPLICATIONS:

Work will be continued by E. Froese (GSC) and E. Zaleski (U of M) in the Snow Lake area. Froese will be studying alteration zones at Cook Lake, Wolverton Lake and other selected localities. Zaleski will continue thesis studies on the Linda massive sulphide deposit and associated alteration zone. Reports in Current Research 87-1B.

Work will begin by a graduate student (U of M) to define and quantify the mineralogical and chemical composition of the garnet-anthophyllite unit within the Sherridon structure. Report in Current Research 87-1B.

Studies are carried out in cooperation with Sherritt Gordon Mines Limited and Hudson Bay Exploration Limited. The companies are interested in the characterization of alteration types to enable their effective use in exploration.

PROJECT: C.1.1.3: U/Pb geochronology, Churchill Province

INVESTIGATOR: GSC/PreC - T.M. Gordon

OBJECTIVES:

To sample selected areas for subsequent zircon U/Pb work (e.g. 1984 Flin Flon-Snow Lake area). Work over time of agreement will complement other GSC and ERDA projects and will be arranged in consultation with Manitoba.

PROGRESS:

a) T.M. Gordon collected material from volcanic and plutonic rocks in the Flin Flon belt.

b) Processing of samples confirmed an 1871 ± 20 Ma age for the Cliff Lake pluton and 1830 ± 25 Ma age for the Ham Lake pluton. Zircons from the other samples have highly discordant U/Pb isotopic ratios. These samples are being re-processed. Six samples were processed during the winter.

PRODUCTS:

Baldwin, D.A., Syme, E.C., Zwanzig, H.V., Gordon, T.M., Hunt, P.A. and Stevens, R.D.

1985: U/Pb zircon ages from the Lynn Lake and Rusty Lake metavolcanic belts, Manitoba; Geological Association of Canada-Mineralogical Association of Canada, Program with Abstracts, volume 10, p. A3. The manuscript is in preparation.

Poster at Manitoba Energy and Mines Annual Meeting with Industry.

FOLLOW-UP AND IMPLICATIONS:

Preparation and analyses of samples collected in 1985 to continue at GSC lab. No field work in 1986. Funds cover laboratory costs only. Current Research publication for 87-1B. Presentation at FONB (Friends of the Nickel Belt) sponsored workshop in April, Winnipeg.

PROJECT: C.1.2.1: Sub-Paleozoic compilation/core drilling

INVESTIGATOR: GSC/PreC - T.M. Gordon (E. Froese, J.C. McGlynn)

OBJECTIVES:

To investigate, map and interpret Precambrian geology beneath Paleozoic cover rocks adjacent to the edge of the Shield. Involves a geological compilation of sub-Paleozoic basement geology, modelling of geophysical anomalies, correlation with exposed surface geology, geological synthesis of basement geology, selection of targets for drilling, logging of already available and new drill core and production of final synethesis. GSC will be particularly responsible for drill target selection and drilling in areas not accessible from roads. Close consultation and cooperation will be maintained between GSC abd MGSB. Appropriate geophysical downhole probes will be used to measure various geological parameters. Paleozoic core will be stored in MGSB facilities for study in connection with other projects.

PROGRESS:

Staffing action was withdrawn and a contract let to Taiga Consultants Limited to carry out phases 1 and 2. The drilling contract has been delayed to 1986-87. Preliminary results were supplied to Manitoba Energy and Mines to help in planning the 1986 summer drilling program.

FOLLOW-UP AND IMPLICATIONS:

An in-house study to interpret available geophysical data will be followed by a drilling contract, with drilling to be completed by spring 1987.

PROJECT: C.2.1.1: Flin Flon-Snow Lake metallogeny

INVESTIGATOR: GSC/PreC - J.M. Franklin

OBJECTIVES:

To obtain an understanding of controls in gold, massive sulphide and granitoid-related deposits; alteration, structure, petrology and isotopic geochemistry in relation to genesis will be emphasized. The project represents a continuation of existing studies and will involve: regional setting of mineralization in light of the tectonic history of the area; geochemical and isotopic studies; metallogenic comparisons between deposits in the Churchill Province and similar types in Archean terrains. The Flin Flon-Snow Lake area is well known for its massive sulphide deposits and potential for further discoveries exists. Gold deposits in the area have received only brief investigations in the last 30 years. Granitoid-related mineralization is ubiquitous but its economic significance is unknown.

PROGRESS:

a) 1:5000 scale mapping was initiated in the area centered on the town of Snow Lake by A.G. Galley and D.E. Ames with two assistants. Drill core from the Nor Acme Mine and the Goldfields prospect was logged and sampled. R. Skirrow completed his field study of alteration deep in the footwall to the Chisel Mine massive sulphide deposit.

b) From this preliminary work it would appear that the gold mineralization occurs along a series of faults subsidiary to the McLeod Road Thrust Fault. Detailed studies on the gold deposits indicate a multi-stage emplacement of gangue minerals and late stage emplacement of the gold accompanied by local retrograde metamorphism.

PRODUCTS:

Galley, A.G., Ziehlke, D.V., Franklin, J.M., Ames, D.E., and Gordon, T.M., in press: Gold mineralization in the Snow Lake-Wekusko Lake region, Manitoba: CIM Special volume, Gold in the Western Shield.

Galley, A.G., Gold Metallogeny of the Flin Flon-Snow Lake Belt: talk given to the official gold delegation, People's Republic of China.

FOLLOW-UP AND IMPLICATIONS:

A six person field party will continue 1:5000 scale mapping around the town of Snow Lake. The region includes some of the largest gold occurrences in the Belt and detailed mapping of the structures in the area is necessary in determining control on emplacement of gold deposits.

A large detailed structural analysis of the Elbow Lake area will begin. This study covers an area which includes over 25 gold occurrences, and is the last area of supracrustal rocks in the Belt to be examined.

Results from work in these two areas will include a 1:5000 scale map of the Snow Lake area and a 1:20 000 scale map of the Elbow Lake area with emphasis on gold metallogeny.

Progress reported in Current Research 1987.

PROJECT: C.2.2.1: Metallogeny of mafic-ultramafic rocks, Flin Flon-Snow Lake area

INVESTIGATOR: GSC/EGM - J.M. Duke

OBJECTIVES:

To characterize mafic-ultramafic bodies in the Flin Flon-Snow Lake area with emphasis on their potential to host magmatic sulphide (Ni-Cu-PGE) and oxide (Cr-Ti-V) mineralization. The first phase will involve mapping, sampling and petrological characterization of the major bodies in the belt over a two year period. The second phase will include more detailed studies of selected bodies and mineralization. The first phase is being undertaken under contract to the University of Manitoba.

PROGRESS:

a) Ten mafic-ultramafic plutons in the Flin Flon-Snow Lake area have been examined by J. Young and L.D. Ayres of the University of Manitoba. New geologic maps have been prepared for each pluton.

b) Four plutons are subvolcanic, two are high level synvolcanic, two are syntectonic and two are late tectonic or post-tectonic.

PRODUCTS:

A poster session highlighting the results of this project was presented at the 1985 Manitoba Energy and Mines Annual Meeting with Industry. A final report on this project will be submitted on June 30, 1986.

FOLLOW-UP AND IMPLICATIONS:

Funds for the year will provide PGE analysis of sulphide bearing samples of the Reed Lake Complex, Jackfish Lake Complex, Chisel Lake Complex and the Narrow Lake deposit. A report describing the salient petro-chemical features of Flin Flon-Snow Lake mafic-ultramafic rocks is expected by June 30, 1986.

The current interest in platinum group elements and their association with mafic-ultramafic complexes has led to considerable interest in the progress and results of this project. The identification of layering in the Reed Lake and Chisel Lake complexes is particularly noteworthy in this regard.

PROJECT: C.3.1.1: Aeromagnetic gradiometer surveys

INVESTIGATOR: GSC/RGG - P.J. Hood

OBJECTIVES:

To provide completed high resolution aeromagnetic gradiometer maps and VLF EM profile data of selected areas. It is anticipated that most or all of the areas proposed by Manitoba will be surveyed during the program but some adjustment of boundaries will be needed. The surveys will be carried out by contractors.

PROGRESS:

Airborne gradiometer surveys were completed in the Nokomis-Sherridon, Namew Lake, Moose Lake and Manitoba/Saskatchewan boundary region in 63K.

FOLLOW-UP AND IMPLICATIONS:

During the 1986/87 fiscal year 5 areas are to be covered by airborne gradiometer surveys. These areas are:

1) Rice Lake (52M, 52L-13NE)
2) Whitemouth (52E-11)
3) Hargrave River (parts of 63J-10,11,12,13)
4) Moose Lake (63K-1)
5) Elbow Lake (63K-15,W 1/2)

Outputs would include total field and vertical gradiometer maps from surveys flown during the 1985/86 fiscal year.

DISTRICT III. SOUTHEAST MANITOBA

Summary and Project listing:

Geological mapping and mineral programming in the Bissett region continued to focus on the long established gold potential of the belt with specific emphasis on new environments for gold deposition. Known deposits were studied and documented in detail. Programs were heavily biased toward intensive sampling and geochemical assays with much larger numbers of rocks and other samples submitted for chemical analysis than ever before. Activities in large part concentrated on the north and east flanks of the greenstone belt from the Jeep Mine to Wallace Lake and from Bennett Lake to Garner Lake, and between Beresford Lake and Moore River. Equal emphasis was given to detailed mapping and sampling in and along the favourable formations east and west of the San Antonio Mine.

In the Bird River region, the initial evaluation of platinum group elements and chromite was extended to encompass detailed geological mapping of the Garner Lake ultramafic body.

MANITOBA GEOLOGICAL SERVICES BRANCH

PROJECT 1.8: Rice Lake geological mapping

INVESTIGATORS: W. Weber, D. Seneshen*, and D. Owens*

OBJECTIVES:

To undertake lithologic and structural mapping of geological environments with known or suspected potential for gold mineralization to improve targetting criteria for exploration.

PROGRESS:

The newly burnt-over area between Beresford Lake, Long Lake and Grassy Rice Bay was mapped and a new geological environment with subaerial basalts and ignimbrites was delineated.

PRODUCTS:

- Preliminary map (1:10 000).
- Report in Report of Field Activities 1985.
- Topics for two M.Sc. theses were initiated.

FOLLOW-UP:

Two M.Sc. theses will be undertaken in the area - one to investigate the detailed structural history in a hinge zone, the other to investigate the depositional environment of the subaerial Manigotagan River formation.

IMPLICATIONS:

The results have been and will be of assistance to gold exploration activities, specifically to Esso Resources presently active in the area.

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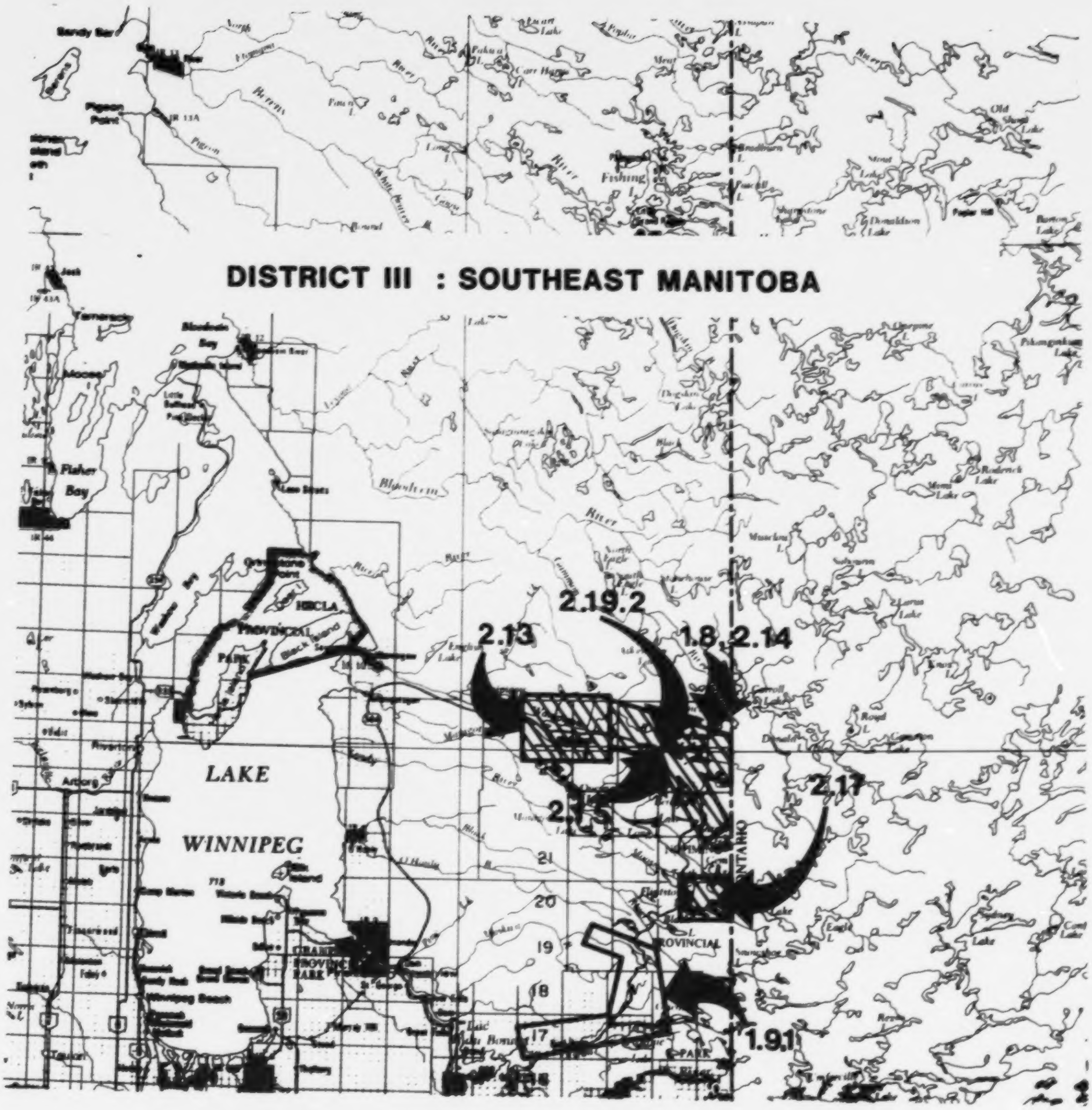
*seasonal investigators


DISTRICT III : SOUTHEAST MANITOBA
2.19.2
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1.9.1
LAKE
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PROVINCIAL
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Manitoba Geological Services Branch:

1.8	Rice Lake geological mapping
1.9.1	Geological mapping, Bird River-Maskwa area
2.13	Gold mineralization, Bissett-Beresford area
2.14	Deposit documentation, Rice Lake area
2.15	Wallace Lake gold deposits
2.17	Platinum group element evaluation, Bird River area and Garner Lake
2.19.1	U-Pb geochronology, Rice Lake region
2.19.2	Gatlan Gold deposit
2.28	Dimension stone, resource assessment

Geological Survey of Canada: (not shown)

C.2.1.2	Bissett structural studies
C.2.2.3	Falcon Lake Stock
C.2.2.5	Bird River Sill

Figure 6: Location of MGSB projects (1985)

PROJECT 1.9.1: **Geological mapping, Bird River-Maskwa area**

INVESTIGATOR: J.J. Macek

OBJECTIVES:

On the basis of reconnaissance work, the Cat Creek area - the northern limb of the Bird River Sill structure - was chosen for detailed mapping (1:10 000) in order to compare the geology of both limbs of the structure.

PROGRESS:

The planned mapping was completed in 1985. Selected targets in the area were examined by geophysical methods. Samples were collected and microscopically examined.

PRODUCTS:

(a) Geological findings and comparisons were published in the Report of Field Activities 1985 (GS-25 - Cat Creek project).
(b) Preliminary map 1985C-1, Cat Creek (Part of 52L-12) was published.

FOLLOW-UP AND IMPLICATIONS:

Further mapping is not recommended due to scarcity of outcrop to the southeast, but extended definition of the principal geological units using geophysical methods may be attempted in future years. Evaluation of PGE potential in the area will be carried out by P. Theyer in the Spring of 1986 based on mapping conducted in 1985.

PROJECT 2.13: **Gold mineralization - Bissett-Beresford Lake**

INVESTIGATOR: P. Theyer

OBJECTIVES:

This program is designed to focus on the detailed investigation of mineral occurrences that are deemed to be of importance to the understanding of mineral deposits in the Rice Lake greenstone belt.

PROGRESS:

Detailed investigations of the San Antonio gold mine resulted in the discovery of previously unrecognized gold mineralization within the host rock that is unrelated to the quartz veins in the deposit. These investigations also showed that the host rock to the San Antonio Mine appears to be a multi-component igneous rock complex rather than a simple mafic intrusion as previously thought.

Detailed investigations in the vicinity of the Jeep Gold Mine revealed the existence of rocks characterized by geochemically anomalous gold concentrations. These rocks will be examined in more detail.

PRODUCTS:

Several preliminary reports deal with the findings related to this program (GS-17, 1983; GS-23, 1984; GS-27, 1985).

FOLLOW-UP AND IMPLICATIONS:

Detailed geological studies of geochemically anomalous zones in the Jeep Mine area and of deposits investigated as a follow-up to the mineral occurrence inventory program (2.14) are expected to provide insight into the gold metallogeny of the Rice Lake greenstone belt. These data will be summarized in a final report that will provide an extensive data base for mineral exploration programs in this area.

PROJECT 2.14: Mineral occurrence documentation - Rice Lake greenstone belt

INVESTIGATORS: P. Theyer, P. Stewart and R. Schmidtke*

OBJECTIVES:

This program will provide an inventory of all known mineral occurrences of the Rice Lake greenstone belt. This inventory will include data on the location, geology and mineral contents of these occurrences. The information will provide an updated data base for the exploration of gold and other commodities in this area.

PROGRESS:

Coverage of the belt has been largely completed with the investigation of approximately 100 mineral occurrences. The location of each of these occurrences has been recorded on airphotos. In addition, the occurrences were sampled and geological sketch maps prepared, where warranted.

PRODUCTS:

Preliminary reports on the progress of this program were published in the Report of Field Activities (GS-24, 1984; GS-28, 1985). These reports provide assay data and basic geological data on over 100 occurrences.

FOLLOW-UP AND IMPLICATIONS:

Several mineral occurrences outstanding due to their high metal contents will be revisited and examined in detail. A final report will be issued after completion of this phase of the program.

*seasonal assistant

PROJECT 2.2: Genesis of the Gatlan and related gold occurrences, Wallace Lake area

INVESTIGATORS: P. Theyer and R. Gaba*

OBJECTIVES:

The investigation of the Gatlan and related gold occurrences in the Wallace Lake area will provide information concerning the geology of the deposits, metal sources and concentrating mechanisms of the numerous smaller gold occurrences in this area. This study will provide guidelines for exploration designed to locate repetitions of this style of mineralization in the area.

PROGRESS:

Detailed geologic mapping of the Gatlan area at a scale of 1:200 has been undertaken and supplemented by the collection of over 300 rock samples. The samples were assayed and thin sections were prepared to determine the source and history of this mineralizing event. The results of the initial phase of the study were followed up by an investigation of the geology and mineralization of numerous other gold occurrences of this region.

PRODUCTS:

A preliminary map (1984R-2) and two preliminary reports (GS-25, 1984; GS-29, 1985) describe the results of this work. A final report describing details of the geology of the Gatlan occurrence was submitted at the end of March 1986.

FOLLOW-UP AND IMPLICATIONS:

The Gatlan gold occurrence appears to be controlled by specific stratigraphic and tectonic components. The search for other areas with similar tectonostratigraphic features resulted in the discovery of previously unknown disseminated sulphides and free gold in iron formation between Wallace and Siderock Lakes. Detailed mapping and sampling of this area is expected to provide information on the economic potential of these rocks.

*seasonal assistant

PROJECT 2.17: Platinum group element potential, Bird River area

INVESTIGATOR: P. Theyer

OBJECTIVES:

The objectives of this program are: (a) to establish the existence of platinum group elements in the Bird River complex of southeastern Manitoba; and (b) to investigate the geological controls and geographical extent of platinum group elements mineralization in this complex.

PROGRESS:

Detailed sampling and mapping programs demonstrated the existence of significant platinum group element concentrations in discrete rock layers of the Chrome property of the Bird River Complex.

PRODUCTS:

Several preliminary reports (GS-9, 1982; GS-19, 1983; GS-34, 1984) describe the progress made on this project. A summary of the chemical and petrographical results was published in an open file report in 1985 (OF85-4) and presented in several lectures (Meeting with Industry 1985, International Platinum Symposium 1985, PDA 1986). The results of this work created significant interest by exploration companies in the exploration potential for platinum group elements in the province. This interest was compounded by the recent upsurge in the prices of these commodities.

FOLLOW-UP AND IMPLICATIONS:

The results of this program clearly warrant its continuation. Short-term objectives are: (a) investigations dealing with suspected lateral extensions of platinum group element-bearing rock layers in other exposures of the Bird River complex; and (b) preliminary investigations of certain sulphide-bearing gabbroic bodies believed to represent the northern flank of the Bird River complex. A long-term objective is the investigation of other selected mafic and ultramafic complexes in Manitoba for their potential to contain platinum group elements.

PROJECT 2.19.1: U-Pb geochronology - Rice Lake region

INVESTIGATORS: A. Turek*, W.D. Taylor (University of Windsor)
W. Weber
R.Van Schmus* (University of Kansas)

OBJECTIVES:

To determine U-Pb zircon ages for selected rock units to provide an absolute chronostratigraphy, and to assist in identifying gold mineralization.

PROGRESS:

Three additional rock units were sampled in 1985. From the 16 samples collected in total, 8 units were dated.

PRODUCTS:

Report in E. & M. Report of Field Activities 1985.
Abstract to GAC-MAC 1986 Annual Meeting.

FOLLOW-UP AND IMPLICATIONS:

Final data to arrive in 1-4 weeks (i.e. mid-May 1986).

Present results do not indicate presence of greater than 2900 Ma old volcanics similar to Red Lake gold hosts; thus Red Lake model may not be suitable for Rice Lake. An attempt should be made to date mafic rocks around Wadhope and late porphyries in Bissett. Granitoids older than 2900 Ma, north of the belt, suggest a major crustal break may have been a contributing factor favouring development of gold mineralization in the Bissett-Wallace Lake area.

*Principal investigators

PROJECT 2.28: Dimension stone resource assessment

INVESTIGATOR: B.E. Schmidtke

OBJECTIVES:

The objective of this program is to determine the nature and extent of Manitoba's dimension and ornamental stone resources and to provide an inventory of materials with a potential for future development.

PROGRESS:

Eighty-six sites in S.E. Manitoba were examined, documented and sampled. Polished slabs have been prepared for most of the samples. Strength tests were performed on the most promising sites.

PRODUCTS:

Site location map and preliminary report in the 1985 Report of Field Activities describe the findings in S.E. Manitoba.

A brochure sponsored by Sector C featuring the most promising sites for dimension stone and the present producers is in the final editing stages.

Interest by the industry and the establishment of a finishing plant in Winnipeg that will be supplied by stone from several of these sites warrant the continuation of this project.

FOLLOW-UP AND IMPLICATIONS:

Two months of the 1986 field season will be used to survey granite intrusions and greenstone belts of S.E. Manitoba, for building stone, tombstone, flagstone, decorative aggregate and ornamental stone. A final report will be prepared on the project in 1987 or 1988.

GEOLOGICAL SURVEY OF CANADA

PROJECT C.2.1.2: **Bissett structural studies**

INVESTIGATOR: GSC/EG - K.H. Poulsen

OBJECTIVES:

To examine regional features directly related to localization of ore; to do detailed structural analyses of selected gold deposits (including San Antonio mine); emphasis of structural controls on mineralization at all scales; address metamorphic and stratigraphic controls where appropriate; to be done in conjunction with similar comparative studies in other terrains, notably at La Ronge in Saskatchewan.

PROGRESS:

(a) Operations:
- Bissett Gold District field work - May 14-June 12, 1985, Ames, Galley, Poulsen + 2 assistants.
- Surface structural mapping, completed northern half of study area.
- San Antonio Mine-underground mapping + sampling - Nov. 27 - Dec. 12, 1985, Ames, M.Sc. student, - Lau.
- March 7-12, 1986, Poulsen, Ames, Lau.

b) Definition: "Normandy Creek Shear Zone:, gold-associated carbonate alteration.

PRODUCTS:

K.H. Poulsen, D.E. Ames, S. Lau and W.C. Brisbin: The structural setting of gold in the Rice Lake area, Uchi Subprovince, southeastern Manitoba: A preliminary report; in Current Research, Part B, Geological Survey of Canada Paper 86-1B (in press).

Poster: Lau, S., Brisbin, W.C. and Ames, D.E. Vein geometry at the San Antonio Mine, Bissett, Manitoba (Manitoba Energy and Mines Annual Meeting with Industry).

Poster: Ames, D.E., Galley, A.G., and Poulsen, K.H. Structural studies in the Bissett Area, Manitoba (Manitoba Energy and Mines Annual Meeting with Industry).

Talk: Poulsen, K.H., Ames, D.E., Lau, S., Brisbin, W.C. and Galley, A.G. Structural analysis of the San Antonio Mine and surrounding area, Bissett, Manitoba (Manitoba Energy and Mines Annual Meeting with Industry).

FOLLOW-UP AND IMPLICATIONS:

Structural analysis of the Bissett area will be continued on two scales: a six person party will continue surface mapping at 1:10 000 scale in the region centered on the San Antonio Mine, while more detailed mapping and core logging will be carried out in the mine itself.

The summer work for 1986 will be a continuation of the study of structural controls and alteration related to gold mineralization in the area, with field work continuing into 1987/88.

Work is progressing in collaboration with major mining companies in the area.

PROJECT C.2.2.3: Falcon Lake Stock

INVESTIGATORS: GSC/EGM - R.F.J. Scoates

OBJECTIVES:

To investigate the petrology, tectonic setting, and precious metal mineralization in the Falcon Lake Stock. The stock hosts significant gold mineralization and an unconfirmed occurrence of platinum group elements. An investigation of the primary layered structures, modally graded layers and characterization of the petrotectonic setting is to be carried out under contract by W.C. Brisbin of the University of Manitoba. The study of the mineralization will also be undertaken as a Master's project.

PROGRESS:

Completion of the structural mapping part of this project has led to the development of a model concerning the magmatic history of the Falcon Lake Igneous Complex. The distribution and relative ages of the different units suggest that the body was tabular not dyke-like in its early stages and evolved into a larger, more cylindrical form. Preliminary results from the study of precious metal mineralization indicate that the mineralization within the complex is associated with quartz monzonite, granodiorite and diorite. Mineralization within the complex is structurally controlled, whereas that in the surrounding host rocks exhibits aspects of structural and stratigraphic control. The project will be completed in 1987-88.

PRODUCTS:

A poster session outlining the progress of this project was presented at the 1985 Manitoba Energy and Mines Annual Meeting with Industry. The project was conducted by W.L. Mandziuk, J.L. Fingler and W.C. Brisbin of the University of Manitoba.

FOLLOW-UP AND IMPLICATIONS:

Three subprojects are now underway:

1. A final report on the internal structural fabric of the complex will be prepared on or before June 30, 1986.

2. The study of Au mineralization will continue and focus on completing the detailed mapping and sampling of occurrences in the complex.
3. A new project to document the petrochemistry of the Falcon Lake Igneous Complex will be initiated under the direction of N. Halden (U of M).

Since the inception of the project there has been increasing exploration activity evaluating the economic potential of the known precious metal mineralization associated with the complex. A headframe has been erected on the Waverley deposit which is currently being evaluated in terms of possible production of gold.

PROJECT C.2.2.5: Bird River Sill

INVESTIGATORS: GSC/EGM - R.F.J. Scoates

OBJECTIVES:

To obtain a detailed petrologic understanding of the Bird River Sill, in particular in relation to magmatic chromite and sulphide mineralization; to be carried out by GSC permanent staff (Scoates, Duke, Eckstrand and Williamson).

PROGRESS:

a) R.F.J. Scoates, J.M. Duke, O.R. Eckstrand and B. Williams continued investigations of the Bird River Sill with emphasis on detailed mapping (B.W.), PGE distribution (R.F.J.S.), layer disruption (J.M.D., R.F.J.S., B.W.), and possible extension of the stratigraphy to the east into the Maskwa-Dumbarton area (O.R.E.).

b) Preliminary results of this work have led to the development of a conceptual model designed to explain layer disruption observed in the Ultramafic Series, PGE mineralization, and the occurrence of harrisites.

FOLLOW-UP AND IMPLICATIONS:

Field mapping on the 1:100 scale of the Chrome property will continue. Further evaluation of the PGE-bearing magmatic sulphide layer associated with the Lower Group chromitites will be made. Samples will be collected to determine PGE contents as well as Se/S ratios.

Outputs will include descriptions of ultramafic series rocks in GAC/MAC '86 Field Excursion Guidebook 13 and in a poster session at the GAC/MAC '86 Symposium on Layered Igneous Rocks.

There is current interest in the chromite reserves of the Bird River Sill (CANMET-ERDA-related activities) and in the anomalous PGE concentrations that have been found as a result of our work. Both chromite and PGE are considered to be strategic materials.

DISTRICT IV. THOMPSON

Summary and Project listing:

Much of the work in the Thompson and Pikwitonei region explored the potential for diversifying the existing mineral base. Projects focussed primarily on rare-element-enriched pegmatites, the known occurrences of iron, vanadium and titanium, and an evaluation of potential gold metallotects both in the Cross Lake greenstone and gneissic Pikwitonei terrain. Uranium/lead and rubidium/strontium isotope investigations were used to unravel the complex crustal evolution of this segment of the Superior Province and a geological compilation program collated and synthesized data on the economically significant geology of the Churchill-Superior Boundary Zone itself.

In this the second year of the Agreement the study of the rare-element-enriched pegmatites was extended to encompass much of the Northern Superior Province.

MANITOBA GEOLOGICAL SERVICES BRANCH

PROJECT: Cross Lake NE - geological mapping

INVESTIGATOR: J.J. Macek

OBJECTIVES:

To update in detail the geological and petrological data base for evaluation of mafic-ultramafic-hosted mineral deposits and provide regional geological data for compilation.

PROGRESS:

(a) Grass River area between Setting and Paint Lakes was mapped on a 1:20 000 scale;
(b) the mapping was completed on Cross Lake NE;
(c) geological investigations were conducted in the western part of the Sipiwesk area to document tectono-metamorphic changes across the limit of the Hudsonian overprint.

PRODUCTS:

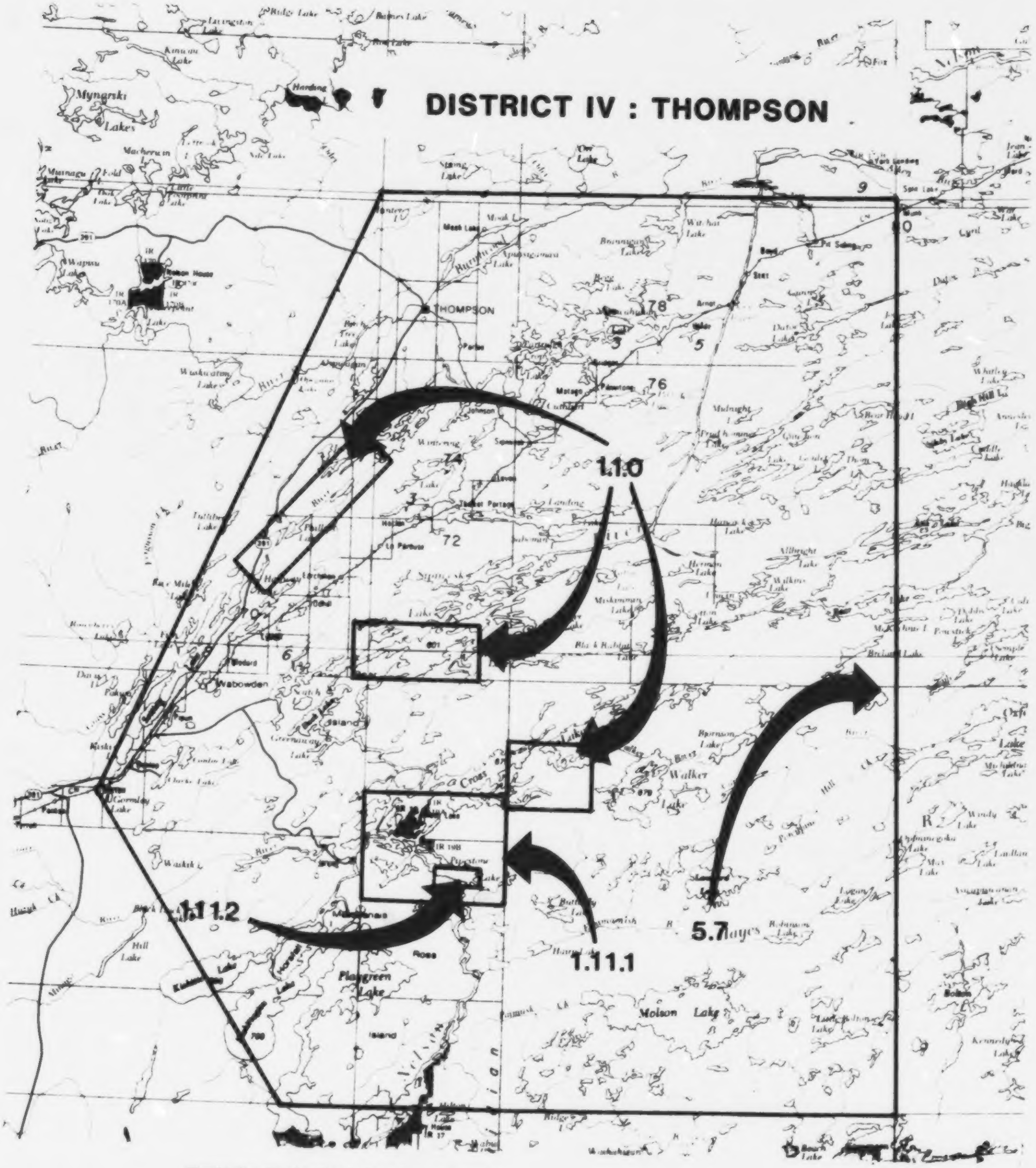
- Preliminary map 1:20 000, Phillips Lake.
- Preliminary map 1:50 000, northeast Cross Lake.
- Associated reports in the Report of Field Activities 1985.
- Contribution to the field trip guidebook (in progress).

FOLLOW-UP AND IMPLICATIONS:

Mapping on Phillips Lake (Grass River area) provided geological information (from the last major unmapped area), necessary for the 1:250 000 scale compilation of the Thompson Belt (in progress).

Mapping on NE Cross Lake completed geological data collection from a large area (Cross, Walker, Bjarnason, Lawford and Fairy Lakes) and resulted in a uniform legend which is to a significant degree already correlated with work by Corkery, Lenton and Cameron.

A field trip guidebook of the western Sipiwesk area is near completion.


DISTRICT IV : THOMPSON
THOMPSON
Wabowden
Molson Lake
Plumgreen Lake
1.10
1.11.2
1.11.1
5.7

Manitoba Geological Services Branch:

1.10	Cross-Split Lake mapping and evaluation
1.11.1	Cross-Pipestone Lake mapping
1.11.2	Titanium-vanadium evaluation
1.12	Uranium/lead geochronological sampling
1.15	Rubidium-strontium isotope investigations
1.16	Rubidium-strontium isotope investigations
2.20	Rare-element-enriched pegmatite evaluation
5.7	Thompson-Pikwitonei compilation
5.11	Limestone River compilation

Geological Survey of Canada: (not shown)

C.1.1.4	U/Pb geochronology, NW Superior Province
C.1.1.5	Structural studies, Thompson Belt
C.2.2.6	Metallogeny of mafic-ultramafic rocks, Thompson Nickel Belt.

Figure 7: Location of MGSB projects (1985).

PROJECT 1.11.1 & 1.11.2: Cross Lake, geological mapping and regional evaluation

INVESTIGATORS: M.T. Corkery and H.D.M. Cameron

OBJECTIVES:

The objective of this program is to stimulate and direct mineral exploration in the Cross Lake-Thompson region, to provide a broader mineral base for the Thompson region by establishing an updated geological data base for supracrustal and ultramafic-anorthositic rocks which contain occurrences of strategic, base and precious metals.

PROGRESS:

Geological mapping in the central Cross Lake area was completed and mapping was extended to cover Pipestone Lake. Geochemical analysis of least altered rocks representing volcanic, plutonic and sedimentary rocks was completed (85 samples). Fifteen samples were analyzed for rare earth elements.

Evaluation of titanium-vanadium-bearing magnetite-ilmenite layers within a gabbro-anorthosite complex was completed. Detailed and regional mapping extended eastward from the previously reported area. Samples were submitted for geochemical analysis, including 5 samples for rare earth elements; as well, samples were submitted for titanium-vanadium assay.

PRODUCTS:

Preliminary map 1985 N-2 and a preliminary report (GS-32) in the 1985 Report of Field Activities describe the findings in the Pipestone Lake area.

Preliminary Report GS-33 in the 1985 Report of Field Activities documents the preliminary findings of titanium-vanadium concentrations in the anorthosite-gabbro complex.

FOLLOW-UP AND IMPLICATIONS:

A further field season will concentrate on 1:20 000 scale mapping in the western Cross Lake area and endeavour to trace the anorthosite-gabbro complex westward.

Investigations of supracrustal rocks in the eastern part of the Superior Province will be delayed indefinitely. Instead, mapping for the remainder of the MDA will concentrate on the more accessible areas in the Thompson district. This area appears to be most promising for V, Ti mineralization.

This change is also related to the fact that the rare-element-enriched pegmatites were found to be more restricted than previously anticipated. Therefore, the extension of the Provincial pegmatite evaluation into the easternmost Superior was cancelled and efforts were redirected into the Cross Lake area (see Project description 1.17).

PROJECT 1.12: Field and evaluation support for U-Pb isotope

INVESTIGATORS: W. Weber in cooperation with T. Krogh, L. Heaman and N. Machado, Royal Ontario Museum and Geological Survey of Canada

OBJECTIVES:

To collect and provide rock samples for U-Pb isotope investigations, to provide a geological framework for determining rock units to be sampled, and to contribute to the geological evaluation of the U-Pb ages determined in the laboratories of the Royal Ontario Museum. Analyses are funded by the GSC.

PROGRESS:

Thirty-two samples were collected and 23 additional zircon fractions were analyzed.

PRODUCTS:

- Report in E. & M. Report of Field Activities 1985.
- Internal Progress Report - March 1986.
- One manuscript submitted to "Contributions to Mineralogy and Petrology".
- Two abstracts to the GAC-MAC 1986 meeting.

FOLLOW-UP AND IMPLICATIONS:

Several more units will be collected during the 1986 field season, specifically supracrustal and granitoid rocks of the Thompson belt.

Results demonstrate that granulite metamorphism is late Archean supporting a similar conclusion based on field observations.

Results also indicate that rare-element-enriched pegmatites and uraniferous granites in NW Superior may be coeval with granulite metamorphism in the Pikwitonei region.

Results demonstrate that the tectonic overprint in the Thompson Belt is late Hudsonian in age, and that sulphide concentrations may have been affected by this overprint.

PROJECT 1.15: Project Management

INVESTIGATOR: W. Weber

OBJECTIVES:

- To enable supervision of field projects and conduct field demonstrations for potential MDA contributors.
- Participate in MDA related field demonstrations.

PROGRESS:

Field trips were conducted along the south flank of the Kisseynew gneissic belt as well as the Flin Flon, Thompson, S.E. Manitoba and Island Lake-Bigstone Lake regions.

PRODUCTS:

Coordination of regional operations, syntheses of regional geology, integration of otherwise isolated and individual project contributions.

FOLLOW-UP AND IMPLICATIONS:

- Field trip in the Thompson district.
- Initiation of airborne gradiometer surveys in the Bissett region to complement GSC and MGSB field projects.

PROJECT 2.20: **Rare-element-enriched pegmatite evaluation**

INVESTIGATORS: P. Černý (Univ. of Manitoba) (G.H. Gale)

OBJECTIVES:

This project is designed to investigate and document occurrences of rare-element-enriched pegmatites in north-central Manitoba and to establish techniques for exploration and evaluation.

PROGRESS:

This project is on schedule and proceeding as planned. Several pegmatite fields have been delineated and studied. A new rare-element-bearing field has been discovered to date.

PRODUCTS:

- Annual report at fiscal year end received March 1986.
- Preliminary report in 1984, 1985 Reports of Field Activities.

FOLLOW-UP AND IMPLICATIONS:

This contract will be renewed for 1986. An open file report is planned for 1986 to facilitate publication of new data considered important to mineral exploration in the area.

PROJECT 5.7: **Thompson-Pikwitonei compilation**

INVESTIGATORS: W. Weber and J.J. Macek

OBJECTIVES:

To provide a comprehensive and up-to-date regional geological framework for identification of more mineral exploration targets.

PROGRESS:

U-Pb dating by ROM (see MGSB Project 1.12) largely funded by the GSC has provided a partial framework for compilation. Project 1.10 provided additional data. University research (State University of New York, University of Wisconsin), which is NSF funded, provided additional petrological data.

PRODUCTS:

Included in project reports (i.e. MGSB Project 1.12). Fiscal year-end Internal reports.

FOLLOW-UP AND IMPLICATIONS:

- Work mentioned under Progress is continuing for another two years.
- Detailed mapping project to be started at Thompson Pit to evaluate supracrustal rocks.

- Contacts with INCO and Falconbridge initiated in order to obtain access to surface, drill and geophysical data necessary for the 1:250 000 synoptic geological compilation.

PROJECT 5.11: **Limestone River compilation**

INVESTIGATOR: W.D. McRitchie

OBJECTIVES:

To collect field data for 1:250 000 geological compilation of NTS 54D.

PROGRESS:

Helicopter-borne reconnaissance completed 1250 line km traverses documenting limit of bedrock exposure, and all major outcrop areas north of the Nelson River.

PRODUCTS:

Revised 1:250 000 manuscript and preliminary report (GS-42) in Report of Field Activities 1985.

FOLLOW-UP AND IMPLICATIONS:

Need for more detailed, areally restricted, follow-up in extreme southwest between Nelson River and Gillam Highway.

GEOLOGICAL SURVEY OF CANADA

PROJECT C.1.1.4: **U/Pb Geochronology, N.W. Superior Province**

INVESTIGATORS: GSC/PreC - T.M. Gordon (J. Percival, K.D. Card)

OBJECTIVES:

Contract to T. Krogh, ROM, to sample selected areas for subsequent U/Pb geochronology studies. Details of work to be arranged when funding finalized.

PROGRESS:

a) Sample collection and laboratory work carried out by T. Krogh. 32 additional samples were collected from the Thompson Belt and Pikwitonei domain. Analyses of 10 zircon fractions were completed by the beginning of October.

b) Assorted ages contribute to unravelling the complex geology of the Thompson Belt and Pikwitonei region.

PRODUCTS:

Krogh, T., Heaman, L., Machado Fernandez, N. and Weber, W.
1985: U-Pb Geochronology Program: Thompson Belt and Pikwitonei domain; in Manitoba Energy and Mines, Report of Field Activities 1985, p. 183-184.

FOLLOW-UP AND IMPLICATIONS:

Twelve samples are to be prepared and processed by the contractor from submission by Manitoba Geological Services Branch. Data will be published in journals as completed. Collection of 8-10 samples will be undertaken in the Cross Lake region by Davies in order to further broaden the data base for Superior age dates. NASA sponsored field trip and workshop in Thompson will allow for presentation of data.

Age relations are necessary to understand the basic geological framework and construct metallogenetic models.

PROJECT C.1.1.5: **Structural Studies, Thompson Belt**

INVESTIGATORS: GSC/PreC - E. Froese, T.M. Gordon

OBJECTIVES:

To determine direction and timing of movement of various crustal blocks, study of shear zones in Thompson Belt; field work based on lakes accessible from Provincial Road 391. Suitable for Ph.D. level project.

PROGRESS:

a) F. Fueten, a graduate student on contract, mapped a strip, 2 km wide and 15 km long (Ospwagan Lake-Paint Lake), across the Thompson Belt. Special attention was paid to structural elements and kinematic indicators in order to establish the tectonic history of the Hudsonian overprint on the Superior Pikwitonei region. An area in the immediate vicinity of the Pipe Mine was mapped in great detail.

b) The style of deformation changes and the intensity of deformation increases towards the Churchill-Superior boundary. The most prominent structural features stem from the Hudsonian overprint on Archean and Proterozoic rocks and suggest vertical movements. This constitutes a constraint for tectonic models of the Churchill-Superior boundary.

PRODUCTS:

Paper will be published in Current Research Paper 86-1B.

FOLLOW-UP AND IMPLICATIONS:

F. Fueten (U of T) will continue detailed mapping and structural studies along a transect across the Thompson Belt from the Pikwitonei granulite terrrain to the Churchill Province. Report in Current Research 87-1B. Presentation at FONB workshop, Winnipeg.

Project carried out in cooperation with INCO Metals Company which supplied information on the Pipe 2 Mine. Correlation of structural features between the Thompson and Pipe 2 Mines will lead to elucidation of structural control of severely deformed orebodies.

PROJECT C.2.2.6: **Thompson Nickel Belt**

INVESTIGATOR: GSC/EGM - O.R. Eckstrand

OBJECTIVES:

To provide a comparison of petrology and geochemistry of barren ultramafic rocks on the west side of Setting Net Lake with ore-bearing rocks on east side of Setting Net Lake fault. The study will utilize drill core provided by a mining company and is therefore predicated on the cooperation of the company. It is expected the study will be done as a Master's thesis project.

PROGRESS:

A three-year study (Ph.D.) with Dr. Paul Williams, University of New Brunswick, which will focus on the structure of the Thompson orebody, is in the process of initiation. Field work will begin in May, 1986.

FOLLOW-UP AND IMPLICATIONS:

Surface and underground mapping will be begun by Walter Bleeker with the participating supervision of Cees Van Staal.

Exchange of field examinations and data with Frank Fueten (Pipe structural study) is expected to be of mutual benefit.

A "Friends of the Nickel Belt" (FONB) field trip to the Thompson Nickel Belt and adjoining Pikwitonei terrane is planned for June 1986.

DISTRICT V. NORTHERN SUPERIOR

Summary and Project listing:

Activities in this region, though given lesser priority than those in established mining districts of the Province, are nonetheless vital to support existing mineral exploration interests engaged in the search for gold as well as base metals. Both Island Lake and Gods Lake have historically been gold producers, and new finds of gold mineralization could result in the development of self-contained mining, milling and smelting operations in these relatively remote and inaccessible sectors of the Province. Geological Services Branch programs included a continuation and compilation of the geological mapping of Island-Bigstone-Knight Lakes and mapping at Ponask and Stevenson Lakes at a scale of 1:250 000 (NTS 53L and 53K) as part of the Precambrian Atlas project.

MANITOBA GEOLOGICAL SERVICES BRANCH

PROJECT 1.13: Bigstone Lake mapping

INVESTIGATORS: W. Weber and K. Neale

OBJECTIVES:

The objective is to provide an updated geological data base interpreted on the basis of modern concepts of base and precious metal deposits in order to assist mineral exploration which is presently active in this area.

PROGRESS:

In 1985 field work was completed in the region and included 1:20 000 mapping of the Wass and Knight Lakes area, and completion of mapping at Bigstone Lake, started in 1984. Work included assays of several sulphide showings in the region.

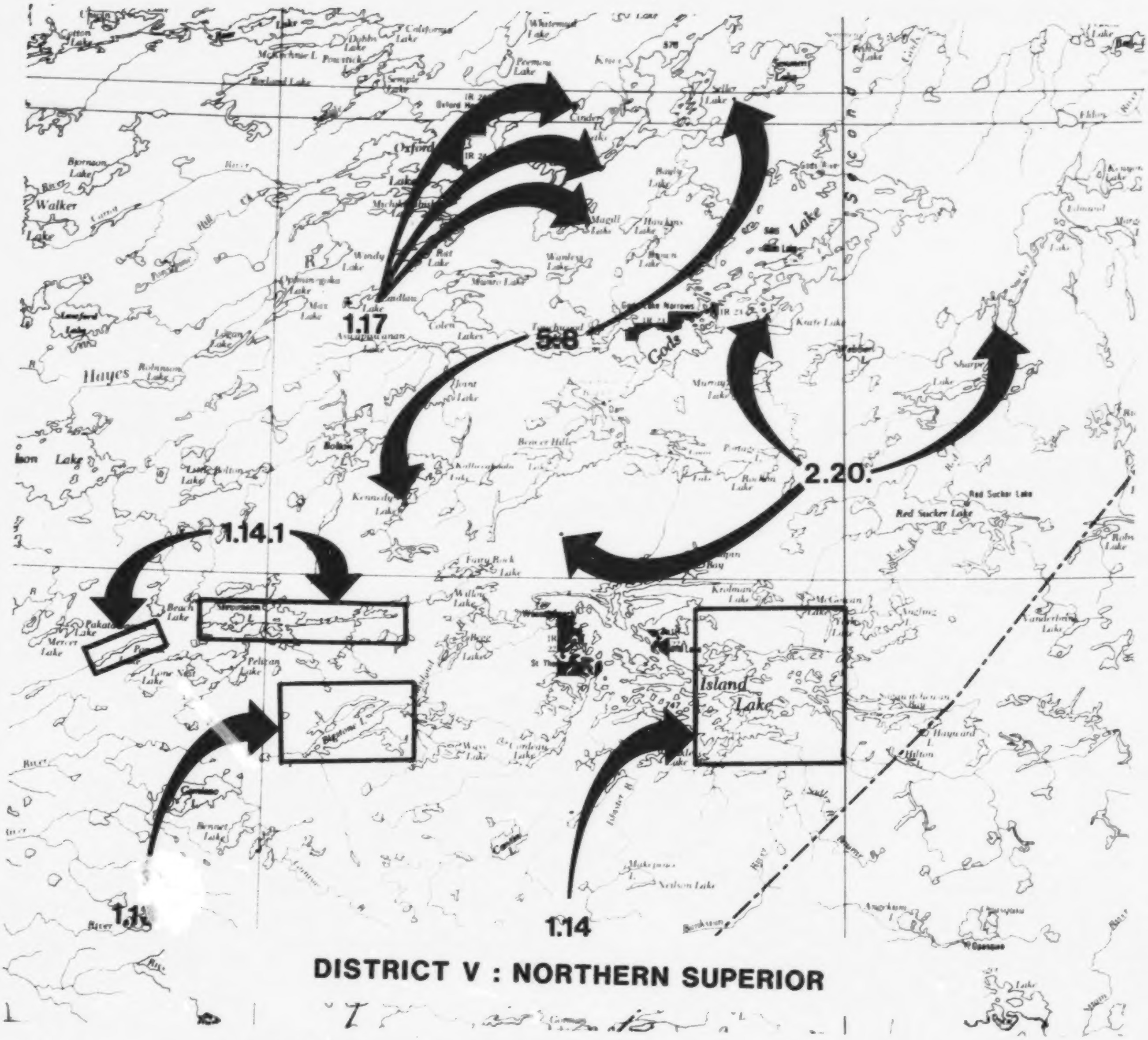
PRODUCTS:

- Preliminary Map 1985B-1: Knight Lake-Wass Lake, 1:20 000 scale, by K. Neale.
- Report in Manitoba Energy and Mines Report of Field Activities 1985 describing stratigraphy and structure of Knight-Wass Lake area.
- Description of alteration and mineralization in the Knight and Bigstone Lakes area, including 21 assay results from 21 sulphide occurrences.

FOLLOW-UP AND IMPLICATIONS:

Mapping project is completed except for an update of the Bigstone Lake map sheet to be released as a revised sheet in the Fall of 1986.

In addition, at least two (2) rock units will have to be dated by the U-Pb zircon method to establish whether the two-fold subdivision recognized in the Bigstone Lake area is correlative with the two-fold subdivision in the Island Lake area, and to establish a basic time-frame for the rocks of the Bigstone-Wass-Knight Lakes area.


1.17
5.8
2.20
1.14.1
1.1
1.14
Island Lake
Gods Lake
DISTRICT V : NORTHERN SUPERIOR

Manitoba Geological Services Branch:

1.13	Bigstone Lake geological mapping
1.14	Island Lake geological mapping (1:20 000 scale mapping)
1.14.1	Stevenson-Ponask geological mapping
1.17	NW Superior, pegmatite evaluation
5.8	1:250 000 synoptic geological compilation, Gods Lake

Geological Survey of Canada: (not shown)

C.2.2.4	Metallogeny of mafic-ultramafic rocks, Fox River Sill
C.4.1.1	Geochemical surveys
C.4.1.3	Surficial materials map
C.5.1.1	Manitoba surficial geology - north of latitude 52°

Figure 8: Location of MGSB projects (1985).

PROJECTS 1.14 and 1.14.1: 1:20 000 scale geological mapping, Island Lake area

INVESTIGATORS: H.P. Gilbert and W. Weber

OBJECTIVES:

To provide an updated geological data base of the Island Lake area and Stevenson Lake area in order to stimulate and support mineral exploration for gold and base metals. Stratigraphic and geochemical investigations of the Hayes River Group volcanic rocks, and the significance of known mineral deposits in the area will be major objectives.

PROGRESS:

In 1985 mapping in the central Island Lake area and Stevenson Lake area was completed. Seventy volcanic rocks have been analyzed to date, and a further twenty-two samples will be analyzed this year.

PRODUCTS:

Preliminary maps of the project area are available, and summary reports covering the stratigraphy, structure and economic geology are given in Reports of Field Activities (E. & M.) for 1981 to 1985.

FOLLOW-UP:

Future work will proceed with analysis of field data and preparation of final maps and report. This will provide an important data base for future mineral exploration in the district.

IMPLICATIONS:

Mapping indicated that the volcanics of the north shore of Island Lake might be of different age (older?) than the mafic-felsic sequence (about 2840 Ma) in the central and southern part. This should be verified by geochronology. Stevenson Lake geology and mineral potential is comparable to the western part of Island Lake. Ponask Lake geology requires more time than anticipated and should include a review of the gabbroic rocks in that area.

PROJECT 1.17: NW Superior pegmatite evaluation

INVESTIGATOR: P.G. Lenton

OBJECTIVES:

The objective of this project is to provide an updated and detailed geological and mineralogical data base for rare-element-enriched pegmatites and associated granites, establish regional geological environment and criteria for source and mode of emplacement. This survey complements geochemical and research activities into rare-element-enriched pegmatites conducted by P. Černý of the University of Manitoba.

PROGRESS:

In 1985 field work was conducted on Cross Lake (4 weeks) and in the Magill-Knee Lake area (5 weeks) with brief periods spent at Cinder, McLaughlin and Hawkins Lakes. All shoreline exposures on Magill Lake were mapped and sampled. All pegmatite occurrences on southern Knee Lake were evaluated.

Forty whole rock geochemical analyses and thirty-five rare earth element analyses were produced for a total of 102 whole rock and 36 REE analyses produced in the program. Synthesis and compilation of the granitic rock geochemistry of Cross Lake is underway.

PRODUCTS:

Results of the field program were presented in the Report of Field Activities 1985 (GS-40). Two previously unreported occurrences of rare-element minerals, one of spodumene and one of beryl, were reported for Knee Lake. An understanding of the age relationships and geochemical variations for plutonic rocks at Cross Lake is developing with the ongoing program at that location. Work at Cinder Lake was hampered by unusually high water levels, but enough information was gathered to give a provisional evaluation of the Cinder Lake syenite body.

FOLLOW-UP AND IMPLICATIONS:

The program to evaluate rare-element-enriched pegmatites in the NW Superior Province indicated a more restricted occurrence for these bodies than previously expected. The decision was made to terminate this phase of the program and redirect work into the Cross Lake and adjacent Churchill-Superior boundary areas. Results of work in this program will be incorporated in the final report for the Cross Lake program. The University of Manitoba program will continue the detailed documentation of pegmatites at Red Cross, Red Sucker, Gods and Magill Lakes.

PROJECT 5.8: 1:250 000 compilation - Gods Lake

INVESTIGATORS: W. Weber, P. Gilbert and D.C.P. Schledewitz

OBJECTIVES:

To review and assemble data for 1:250 000 synoptic geological compilation.

PROGRESS:

Nineteen 1:50 000 maps have been printed (5 re-issues, 14 new) as well as two reports based on work conducted during the early 1970s. Two additional manuscripts are under development. The geological framework of the area has been enhanced by new U-Pb ages developed by Turek (University of Windsor) and Davis (York University) who were both NSERC funded, and the Royal Ontario Museum (MDA funded - see Project 1.12). Rubidium-strontium ages were provided by G. Clark (University of Manitoba) under Provincial funding.

PRODUCTS:

None.

FOLLOW-UP AND IMPLICATIONS:

Synoptic geological compilations at a scale of 1:250 000 for NTS areas 53L and 53M will be completed in the 1986/87 fiscal year.

GEOLOGICAL SURVEY OF CANADA

PROJECT C.2.2.4: **Fox River Sill**

INVESTIGATOR: GSC/EGM - R.F.J. Scoates

OBJECTIVES:

To document the cryptic variation of silicate mineral compositions in the Fox River Sill as a complement to other studies. This work will be of use in modelling petrogenesis of the sill and assessing its potential to host magmatic sulphide and oxide deposits. The work is being carried out under contract to Dr. A.C. Turnock of the University of Manitoba.

PROGRESS:

Within the sequence of Fox River Sill cyclic units studied, cumulus olivine ranges from Fo_{80} to Fo_{89}, cumulus plagioclase ranges from An_{86} to An_{91}, and postcumulus orthopyroxene ranges from En_{79} to En_{83}. Cumulus olivine in thick olivine cumulate layers is Fo-rich (Fo_{88-89}) whereas cumulate olivine in thin olivine cumulate laters is less Fo-rich (Fo_{82-84}).

PRODUCTS:

Results of this project will be presented in a poster session at the 1986 GAC/MAC meetings in Ottawa. The project is being conducted by M. Raudsepp and A.C. Turnock of the University of Manitoba.

FOLLOW-UP AND IMPLICATIONS:

The first phase of a related A-base study of Fox River Sill platinum group element-bearing sulphides has stimulated staking and new diamond drilling of the intrusion. The Fox River Sill represents one of the most significant targets for platinum group element concentration in Canada.

Funds are to cover costs for visit to Fox River Sill to examine drill core obtained during exploration for PGE concentrations.

PROJECT C.4.1.1: **Geochemical surveys**

INVESTIGATOR: GSC/RGG - E.H.W. Hornbrook

OBJECTIVES:

To conduct regional geochemical reconnaissance surveys in selected areas of Manitoba which will be determined after discussions with Provincial counterparts. Sample collection, preparation and analysis will be contracted out while the final open file production and joint release will be done in the GSC. Proposed areas include 64B, F, G; 63I,N,P; 53E (part), L,M (part); 52M (part) and 62P (part).

PROGRESS:

1. 1984 Regional Geochemical Surveys of 64B, F and G published as GSC Open Files 1103, 1104, 1105 consisting of 60 geochemical maps and text.

2. 1985 Regional Geochemical Survey of 63N, 63L(N/2), 63-O(W/2): collection, sample preparation, and analyses of sediment and water samples completed as of March 31/86.
3. Re-analysis of achieved samples from 64B and 64C for Au, Sb and F near completion as of March 31/86.

PRODUCTS:

Friske, P.W.B. and Schmitt, H.R. Regional lake sediment and water geochemical surveys in Manitoba; Poster presented at the Manitoba Energy and Mines Annual Meeting with Industry.

FOLLOW-UP AND IMPLICATIONS:

1986/87: Carry out regional geochemical lake sediment and water surveys in 53E,F,K and with an extension into 53M southern part.

PROJECT C.5.1.1: Manitoba - North of 52° latitude

INVESTIGATORS: GSC/TS - R.N.W. DiLabio, C.A. Kaszycki

OBJECTIVES:

To produce an atlas showing (a) surficial geology, (b) till geochemistry and (c) granular material resources. Coverage to start in NE corner of area and proceed clockwise using data from Dredge, Kaszycki, Klassen, DiLabio (GSC) and Nielsen (MGSB). 'Gaps' in coverage to be filled in by airphoto interpretation and a limited amount of field checking. Legends, other specs, style of presentation to be determined by same personnel.

PROGRESS:

Clarke spent approximately 2 weeks at Island Lake field-checking preliminary airphoto interpretation of NTS 53K and 53L. Final airphoto interpretation and drafting were completed and 1:250K maps of both surficial geology and potential aggregate resources for each area were published as GSC Open Files 1226 (53K) and 1227 (53L).

Work was continued on NTS 53N and 63H.

Clarke is conducting an evaluation of the usefulness of Landsat Multispectral Scanner and Thematic Mapper imagery to augment his conventional airphoto interpretations of surficial geology in northeastern Manitoba.

FOLLOW-UP AND IMPLICATIONS:

Airphoto interpretion of 53E, 53N and 63H will be field checked this summer, final drafting and Open file release is scheduled for later in the fiscal year.

Contracted out airphoto interpretation of 63A(1/2) and 53D(1/2).

In-house airphoto interpretation of 63F,G and K.

Contracted out cartography for publication of B series maps of NTS 53K and 53L.

DISTRICT VI. MANITOBA GENERAL

Summary and Project listing:

In large part these activities represent Winnipeg-based core retrieval and/or compilation programs aimed at supporting mineral exploration interests throughout the Province. Planning continued for the consolidation of drill core in Winnipeg to house drill core obtained from private sector Petroleum and Precambrian exploration in southern Manitoba.

MANITOBA GEOLOGICAL SERVICES BRANCH

PROJECT 2.21: Lead-zinc potential of carbonate rocks in southern Manitoba

INVESTIGATOR: G.H. Gale

OBJECTIVES:

To identify the source of galena float discovered in Manitoba and to determine the potential for occurrence of lead and zinc in carbonate rocks of Manitoba.

PROGRESS:

Phase I of the project is 95% complete. Drill cores have been cut and crushed, and only a few hundred samples remain to be analyzed for the elements Cu, Zn, Pb, Ni, Mn and Fe. The data are currently being filed for computer manipulation. Heavy mineral separates have been completed for all but one profile. The remaining 60 samples are currently being processed and will be analyzed this summer.

PRODUCTS:

Summaries of field work in the Report of Field Activities. Approximately 4,000 samples have been analyzed for 6 elements each.

FOLLOW-UP AND IMPLICATIONS:

Upon completion of the analyses of drill core and heavy minerals in the summer of 1986 the data will be processed and an open file report will be prepared for November 20, 1986(?). The results will dictate the extent and type of work to be undertaken as Phase II of this project.

PROJECT 2.26: Industrial Minerals of the Swan Lake map sheet

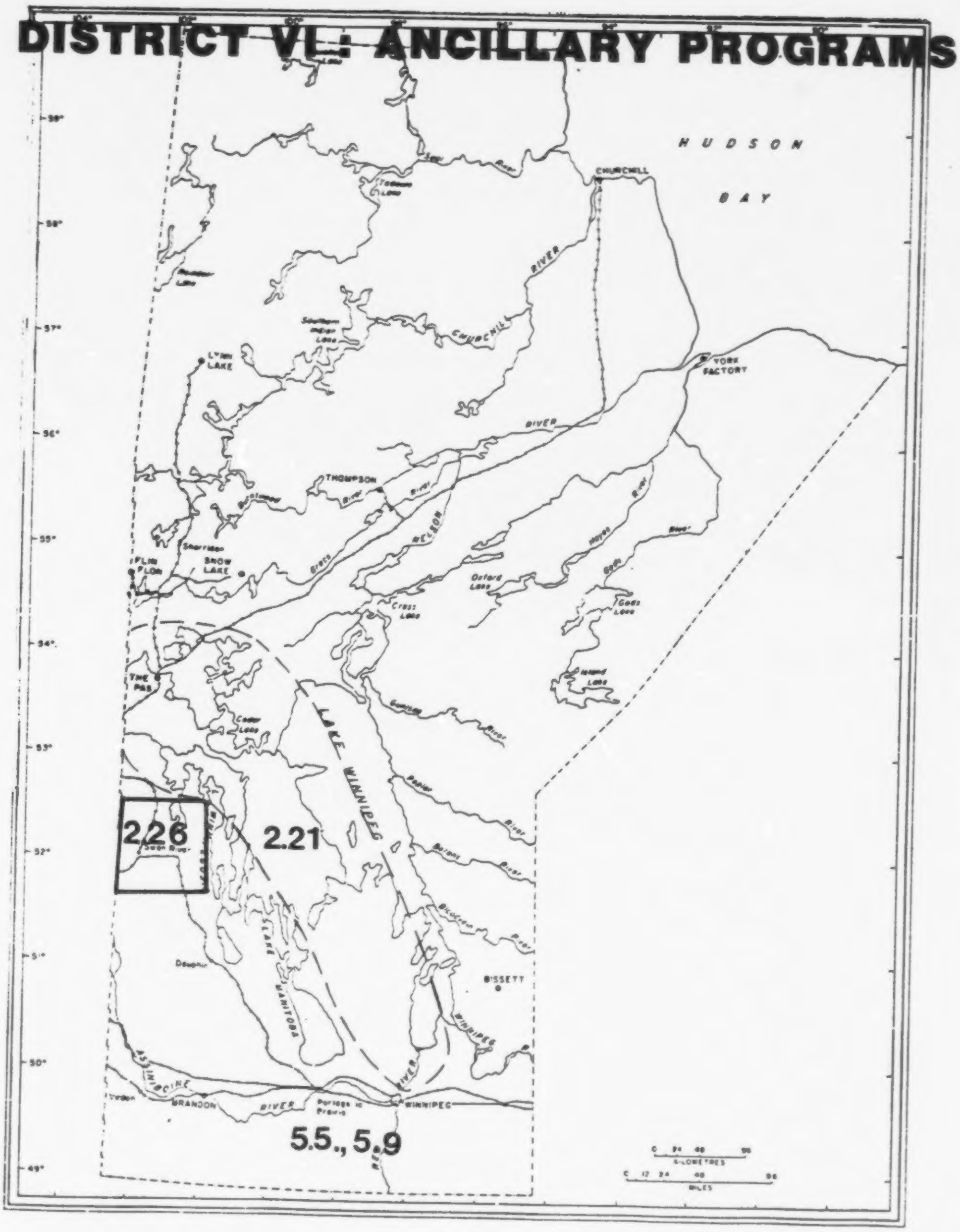
INVESTIGATOR: D. Watson

OBJECTIVES:

This program will document the nature and extent of all industrial mineral occurrences in the Swan River map area. Occurrences of dolomite, limestone, glauconite, silica sand, lignite and bentonite will be examined and sampled, and their geologic setting will be described in detail.

PROGRESS:

DISTRICT VI: ANCILLARY PROGRAMS


HUDSON
BAY
CHURCHILL
CHURCHILL RIVER
YORK FACTORY
LYNN LAKE
Southern Indian Lake
THOMPSON
NELSON RIVER
Sherridon
FLIN FLON
SNOW LAKE
Oxford Lake
Cross Lake
Gods Lake
Island Lake
THE PAS
Cedar Lake
LAKE WINNIPEG
2.26
Swan River
2.21
LAKE MANITOBA
Dauphin
BISSETT
WINNIPEG RIVER
ASSINIBOINE
BRANDON
Portage la Prairie
WINNIPEG
RED RIVER
5.5., 5.9
KILOMETRES
MILES

Manitoba Geological Services Branch:

2.21	Lead/zinc potential of carbonate rocks in southern Manitoba
2.26	Industrial minerals in the Swan River area
2.29	Natural cement rock
5.5	Drill core retrieval, province-wide
5.9	Bibliography and other compilations
5.12	Winnipeg-based mineral deposit compilations

Geological Survey of Canada; (not shown)

C.5.2.1.	Geoscan Data Input

Figure 9: Location of MGSB projects (1985) Manitoba General.

PRODUCTS:

Preliminary report (GS-44)in 1985 Report of Field Activities.

FOLLOW-UP AND IMPLICATIONS:

Watson left the province for private industry after completing the 1985 field season. Samples that he collected are being analyzed at the Logan Laboratory.

A detailed report will be developed following receipt of the analyses.

PROJECT 2.29: Natural cement rock

INVESTIGATOR: D. Watson

OBJECTIVES:

This program will determine the extent and suitability of shales that may be used as natural cement rock and provide an inventory of the resource with a view to promoting its development.

PROGRESS:

Sections of appropriate formations were sampled and mapped in the Miami-Morden area. The area visited included the former cement-producing areas of Arnold and Babcock and outcrop exposures along the Manitoban escarpment. Analyses of the samples were received from Genstar in early December. Some samples were sent to the Logan Laboratory in December in order to obtain analyses to compare with Genstar's.

PRODUCTS:

Sample location map and Genstar analyses.

FOLLOW-UP AND IMPLICATIONS:

After the analyses are completed by the Logan Laboratory an open file report will be completed.

PROJECT 5.2 and 5.5: Drill core retrieval and storage

INVESTIGATORS: P.J. Doyle and J.K. Filo

OBJECTIVES:

To collect Precambrian diamond drill core representative of various stratigraphic suites and mineral prospects for permanent storage in libraries so as to encourage mineral exploration in Manitoba by allowing future re-examination of this core and alleviating the high costs of redrilling.

PROGRESS:

During year two of the Agreement: 37 416 metres of core were collected (stored and catalogued) in 31 separate collections; all requests were initiated by industry; a selective reduction of high density drill projects in Winnipeg and The Pas resulted in the removal of 1944 boxes or 11 851 metres of core; seasonal assistance involved three to five individuals and a total of 499 field days were necessary to accomplish this work (April 1, 1985 to March 31, 1986); library improvements, painting etc. were done in Lynn Lake and The Pas; reorganization, restaking and relabelling of core were carried out in Winnipeg, The Pas and Lynn Lake; work also continued on the NTS-based manual data files for the library system; a computerized core box labelling system was developed - this system will allow staff to label boxes quicker and more cost-efficiently.

PRODUCTS:

Summary (ES-1) in Report of Field Activities. Updated manual data file on holdings. Display materials on the libraries program produced and used at Open House and the PDA.

FOLLOW-UP AND IMPLICATIONS:

During the second year of the Agreement, 26 industry requests were answered and the libraries were utilized for 58 days.

This program has given government personnel the opportunity to interact with industry and obtain valuable information on Manitoba's exploration industry. Secondly, and most importantly, the utilization of the library system by industry has shown that the core program is an important contribution to the mineral exploration data base in Manitoba. This program will continue to aid in the re-evaluation of Manitoba's numerous mineral prospects for years to come.

PROJECT 5.9: Bibliographies, promotion, compilations

INVESTIGATORS: D. Fogwill, P. Leskiw, J. Richardson and others

OBJECTIVES:

To produce bibliographies/indexes for improving access to the large existing geoscience data base of Manitoba; to promote/display Manitoba's mineral potential to attract mineral investment in the Province; and to compile and update (previously compiled) mineral inventory cards describing the Province's mineral deposits/occurrences.

PROGRESS:

The main accomplishment of year two of the Agreement has been the continued high state of excellence of display material constructed for Open House and the Prospectors and Developers Convention. The services pamphlet was updated and enhanced as well as updated companies and consultants lists and promotion of the MDA field geological projects under Sector A and Drill Core Program. Other work this year included development of a computerized bibliography of Federal and Provincial geoscientific publications, revision on the WANG Word Processor of mineral inventory cards describing deposits/occurrences in the Rice Lake greenstone belt, distribution of a brochure on the Drill Core Program, construction of a photographic file of mine and exploration sites, updated assessment coverage index maps and publication index maps and field trips for industry liaison.

PRODUCTS:

Permanent display material. Information pamphlets. Geoscientific bibliography. Mineral inventory cards. Photographic file. Index and information maps.

FOLLOW-UP AND IMPLICATIONS:

The impact of active liaison and promotion with industry through Open House, Conventions and personal contact cannot be measured quantitatively; however, general reaction by industry to displays has been surprise at the number of quality exploration programs ongoing in the Province. It should be noted that for the second straight year all available drills are operating. Release of the "Gold Mineral Inventory Update of the Rice Lake greenstone belt" on March 20, 1986, has resulted in a good response to date.

In year three of the Agreement the bibliography will be expanded to provide cross-reference capabilities by NTS area and subject keywords, and a start will be made on the serial literature. The mineral inventory cards on gold will be used as a foundation for a joint publication with Geological Services entitled "Gold in Manitoba". Updating of base metal cards will also commence in year three.

PROJECT 5.12: **Mineral deposit compilations**

INVESTIGATOR: G.H. Gale

OBJECTIVES:

To provide an organized data base for mineral deposit information on 1:50 000 scale base maps.

PROGRESS:

A prototype 1:20 000 map has been prepared. The techniques and symbols are being tested on a 1:50 000 compilation. This project has been understaffed due to lack of funds and commitments to other projects by the investigator.

PRODUCTS:

1:20 000 prototype map of 63K/13SE

FOLLOW-UP AND IMPLICATIONS:

Two or three 1:50 000 NTS sheets will be developed for the Flin Flon area in the next 12 months. Once the format is established it should be possible to produce 4-6 maps per year.

GEOLOGICAL SURVEY OF CANADA

PROJECT 5.2.1: **GEOSCAN data input**

INVESTIGATOR: GSC/GID - R.G. Blackadar

OBJECTIVES:

Input of data into GEOSCAN.

PROGRESS:

Initial discussions with Manitoba Energy and Mines took place. Currently, Manitoba is not a participant in GEOSCAN, is interested but has not identified necessary resources to handle input of data.

FOLLOW-UP AND IMPLICATIONS:

Discussions between GSC and MGSB.

PROJECT 4.1.3: Surficial materials map

INVESTIGATOR: GSC/TS - R.N.W. DiLabio

OBJECTIVES:

To provide a preliminary surficial map for areas coinciding with geochemical surveys.

PROGRESS:

Project not funded. No work done.

IV. OUTPUTS - PUBLICATIONS, PRESENTATIONS, DISPLAYS, BROCHURES

MDA PUBLICATIONS AND TECHNICAL INFORMATION RELEASES:

MANITOBA*

i REPORTS -
    Departmental publications
    Report of Field Activities
    Preliminary Maps

ii UNPUBLISHED REPORTS -
    (on file in Manitoba Energy and Mines, Geological Services Branch)

iii EXTERNAL PUBLICATIONS

iv MINERAL DEPOSIT FILES

v DATA FILES

vi PRESENTATIONS -

    Manitoba Energy and Mines Annual Meeting
    Other

vii FIELD DEMONSTRATIONS

viii DISPLAYS

ix PHYSICAL ASSETS (MAJOR)

CANADA:

x REPORTS
    Geological Survey of Canada publications
    Report of Field Activities, Manitoba
    Preliminary Reports and Maps

xi EXTERNAL PUBLICATIONS

xii PRESENTATIONS/DISPLAYS

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* Includes output of programming initiated/conducted during the Interim Mineral Agreement (1983)

MANITOBA

1. REPORTS

Departmental Publications

Bedrock Geology Compilation Map 64B	Uhlman Lake - NTS 64B; 1:250 000, with marginal notes - Manitoba Energy and Mines
Geological Report GR84-1	Geochemistry of Metavolcanic Rocks in the Lynn Lake Belt - E.C. Syme
Economic Geology Report ER84-2	Silica in Manitoba - D.M. Watson
Open File Report OF85-3	Preliminary Results of Till Petrographical and Till Geochemical Studies at Farley Lake - E. Nielsen and D.C. Graham
Open File Report OF85-4	Platinum-Palladium Distribution of Ultramafic Rocks in the Bird River Complex, Southeastern Manitoba - P. Theyer
Open File Report OF85-6	The Vegetation Geochemical Signature of the Agassiz-Stratabound Au-Ag Deposit, Lynn Lake, Manitoba - M.A.F. Fedikow
Open File Report OF85-8	Chromite Reserves of the Bird River Sill - D.M. Watson
Open File Report OF85-9	Canada-Manitoba Mineral Development Agreement 1984-89 Sector 'A' Geoscientific Activities, Progress Report 1984-85
Open File Report OF85-11	Mercury Gas Surveys over Base and Precious Metal Mineral Deposits in the Lynn Lake and Snow Lake Areas, Manitoba - M.A.F. Fedikow

Report of Field Activities (released Nov. 20, 1985; 266 p.)

Summary and introductory review (1985-86 program):
by W.D. McRitchie

LYNN LAKE DISTRICT:

GS-1 Lynn Lake regional compilation and geochronology
by H.V. Zwanzig, J.S.D. Parker, D.C.P. Schledewitz and W.R. Van Schmus

GS-2 Rubidium-strontium geochronology in the Churchill and Superior Provinces, northern Manitoba
by G.S. Clark

GS-3 Till sampling along the Agassiz Metallotect
by E. Nielsen, M.A.F. Fedikow and G.G. Conley

GS-4 Till geochemical investigations in northwestern Manitoba
by E. Nielsen

GS-5 Mineral deposit studies in the Lynn Lake and Barrington Lake areas
by D.A. Baldwin, D. Parbery, S. Boden and A. Michielsen

GS-6 Geology and mineral occurrences in the Nickel Lake area, Agassiz Metallotect
by M.A.F. Fedikow and D.R. Eccles

GS-7 A study of the alteration zone associated with the Lar deposit, Laurie Lake area, Manitoba
by S.R. Elliott and E.C. Appleyard

GS-8 Geological investigations at Cartwright Lake, Manitoba
by David C. Peck

GS-9 Evaluation of industrial mineral occurrences in the Lynn Lake area
by W.R. Gunter and P.H. Yamada

FLIN FLON DISTRICT

GS-10 Athapapuskow Lake Project
by Eric C. Syme

GS-11 Geological investigations in the Chisel Lake-Reed Lake area
by Alan H. Bailes

GS-12 Kisseynew Project
by H.V. Zwanzig

GS-13 Kisseynew Project: Kississing Lake, Big Island-Yakushavich Island region
by D.C.P. Schledewitz

GS-14 Kisseynew Project: Geological reconnaissance of Kisseynew Lake West
by W.D. McRitchie

GS-15 Investigation of mineral occurrences in the Kisseynew metasedimentary terrain
by S. Peloquin, G. Ostry and G.H. Gale

GS-16 Geology of the Tartan Lake area
by S. Peloquin and G.H. Gale

GS-17 Geological Setting of the Baker Patton and Centennial Mine sulphide deposits
by D. Hayden-Luck and G.H. Gale

GS-18 Vamp Lake, geology and mineralization
by P. Laznicka and R.S. Wadein

GS-19 Mineral deposit studies in the North Star Lake area
by G. Ostry

GS-20 Mineral occurrence documentation and alteration zone mapping, Snow Lake area
by D.R. Eccles and M.A.F. Fedikow

GS-21 Evaluation of industrial mineral occurrences in the Snow Lake area
by W.R. Gunter and P.H. Yamada

GS-22 Project Cormorant - sub-Paleozoic investigations south of Flin Flon and Snow Lake
by W.D. McRitchie and I. Hosain

SOUTHEAST MANITOBA DISTRICT:

GS-23 Geological investigations in the Stormy Lake area
by D.M. Seneshen and D.J. Owens

GS-24 U-Pb zircon geochronology of the Rice Lake area
by A. Turek, W. Weber and W.R. Van Schmus

GS-25 Cat Creek Project
by J.J. Macek

GS-26 Sub-Quaternary Precambrian investigatons in the Whitemouth Lake area
by W. Weber

GS-27 Mineral deposit investigations in the Rice Lake greenstone belt
by P. Theyer

GS-28 Mineral occurrence documentation in the Rice Lake greenstone belt
by P.W. Stewart

GS-29 Mineral deposit investigations in the Wallace Lake-Siderock Lake area
by R.G. Gaba

GS-30 Fluid inclusion studies - San Antonio mine
by D.F. Strong and G.H. Gale

GS-31 Evaluation of dimension stone potential of granite rocks in southeastern Manitoba
by B.E. Leathers

THOMPSON-CROSS LAKE DISTRICT:

GS-32 Cross Lake supracrustal investigations in the eastern Pipestone Lake area
by M.T. Corkery

GS-33 Pipestone Lake intrusive complex: geological and geophysical investigations
by H.D.M. Cameron

GS-34 Northeastern Cross Lake Project
by J.J. Macek

GS-35 Geological investigations in the Phillips Lake area
by J.J. Macek

GS-36 U-Pb geochronology program: Thompson belt and Pikwitonei domain
by T. Krogh, L. Heaman, N. Machado Fernandez, and W. Weber

GS-37 Evaluation of industrial mineral occurrences in the Thompson area
by W.R. Gunter and P.H. Yamada

ISLAND LAKE-GODS LAKE DISTRICT:

GS-38 Geological investigations in the Island Lake-Stevenson Lake area area
by H.P. Gilbert

GS-39 Geological investigations in the Knight Lake-Bigstone Lake area
by K.L. Neale

GS-40 Granite-pegmatite investigations: Knee Lake-Magill Lake area
by P.G. Lenton

GS-41 Pegmatitic granites, pegmatites and other felsic plutonic rocks at Gods Lake and Red Cross Lake, Manitoba
by L.E. Chackowsky, X. Wang, R. Eby and P. Černý

MANITOBA-GENERAL

GS-42 Limestone River compilation
by W.D.McRitchie

GS-43 Stratigraphic mapping and stratigraphic and industrial minerals core hole program
by H.R. McCabe

GS-44 Industrial Minerals of the Swan Lake area
by D.M. Watson

GS-45 Industrial Mineral investigations: Southern Manitoba
by D.M. Watson and W.R. Gunter

GS-47 Lead-zinc potential in Paleozoic rocks of southern Manitoba
by E. Nielsen and G.H. Gale

EXPLORATION SERVICES SECTION

ES-1* Manitoba's Precambrian drill core collection program
by J.K. Filo and P.J. Doyle

ES-2 Compilation, Promotion and Exploration Services (MDA Project 5.9)
by J.D. Bamburak

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* Funding in part through the MDA

Preliminary Maps 1985 (released Nov. 20, 1985)

1985 B-1	Knight Lake-Wass Lake (53E/11NW) 1:20 000 by K.L. Neale
1985 C-1	Cat Creek (52L/12) 1:10 000 by J.J. Macek
1985 I-1	Wakun Lake (53E/13NE) 1:20 000 by H.P. Gilbert
1985 I-2	Ogit Lake (53E/13NW) 1:20 000 by H.P. Gilbert
1985 I-3	Loonfoot Island (53E/16SE) 1:20 000 by H.P. Gilbert (Revised 1984 I-1)
1985 I-4	Meegeesiwaseeson Island (53E/16SW) 1:20 000 by H.P. Gilbert
1985 I-5	Wagner Island (63H/16NE) 1:20 000 by H.P. Gilbert
1985 K-1	Kisseynew Lake West: Weasel Bay area (63K/13NW) 1:20 000 by W.D. McRitchie
1985 K-2	Big Island-Yakushavich island. Kississing Lake (63N/3) by D.C.P. Schledewitz
1985 N-1	Cross Lake, Northeast (parts of 63I/11, 14) 1:50 000 by J.J. Macek, G. Finnson and G. Liebrecht (Revised 1984 N-1)
1985 N-2	Pipestone Lake (parts of 63I/5 and 63I/12) 1:20 000 by M.T. Corkery and H.D.M. Cameron
1985 N-3	Pipestone Lake, south shore (detailed) (part of 63I/12SE) 1:100 by H.D.M. Cameron
1985 R-1	Stormy Lake (part of 52L/14SW) 1:10 000 by D.J. Owens and D.M. Seneshen
1985 T-1	Phillips Lake (part of 63-O/1, 8) 1:20 000 by J.J. Macek
1985 MI-1	Geology of the Tartan Lake area (part of 63K/13) 1:5000 by S. Peloquin
1985 MI-2	Geology of the Evans Lake (Kay Lake) area (part of 63N/2) 1:5000 by S. Peloquin and D. Hayden-Luck

ii. UNPUBLISHED REPORTS -

(on file in Manitoba Energy and Mines, Geological Services Branch)

Anderson, D.T.
1986: Integrated geological, geochemical and remote sensing study of the host rocks of the Agassiz gold deposit, Lynn Lake, Manitoba; Applied Geoscience Research Agreement, University of Manitoba, 4 p.

Appleyard, E.C. and Elliot, S.R.
1986: Lithogeochemistry and metasomatic flux of the alteration zone associated with the Lar deposit, Lynn Lake area, Manitoba: A progress report; Applied Geoscience Research Agreement, University of Waterloo; 25 p.

Černý, P.
1986: Rare-element-enriched pegmatite evaluation project: Summary report, April 1/85-March 31/1986; 20 p.

Gaba, R.G.
1986: Geology of the Archean turbidite-hosted Gatlan gold occurrence, Wallace Lake greenstone belt, southeast Manitoba: Progress Report; Applied Geoscience Research Agreement, University of Western Ontario, 96 p.

Gunter, R.
1986: Industrial Minerals of Manitoba.

Heaman, L., Machado, N and Krogh, T.
1986: Report on U-Pb dating of the northwestern region of the Superior Province and the Thompson belt in Manitoba.

Krogh, T., Heaman, L. and Machado, N.
1986: Summary of Manitoba U-Pb geochronology projects.

Taylor, W.D.
1985: A study of zircon morphology and previous isotope age determinations from rocks of the Rice Lake greenstone belt, southeastern Manitoba; B.Sc. thesis, University of Windsor.

Turek, A.
1985: Preliminary U-Pb zircon ages from rocks of the Rice Lake greenstone belt.

Turek, A. and Van Schmus, W.R.
1986: Zircon geochronology - Rice Lake greenstone belt, Manitoba.

Turek, A., Weber, W., Van Schmus, W.R.
1985: Zircon geochronology of the Rice Lake area: A progress report (basis for Manitoba Geological Services Branch Report of Field Activities, 1985; GS-24).

Weber, W.
1985: Preliminary interpretation of U-Pb ages from the northern Superior Province.

iii. EXTERNAL PUBLICATIONS

Anderson, D.T., Anderson, C.D. and Misra, K.S.
1985: Use of VLF data in an integrated remote sensing interpretation in north central Manitoba; Ninth District Four Meeting, Thompson, Program with abstracts, p. 17.

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1986: Gold concentrations in till, Great Island, northern Manitoba; in Current Research, Part A; Geological Survey of Canada, Paper 86-1A.

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1985: Evolution of Proterozoic terrains beneath the Williston basin; Geology, v. 13, p. 624-628.

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1986: Evolution of K-feldsdpar in the Red Cross Lake pegmatitic granite and its pegmatite aureole, northeastern Manitoba, Canada; International Mineralogical Association Meeting, Stanford, California, Abstract (submitted).

iv. MINERAL DEPOSIT FILES:

62	Files on gold occurrences in the Bissett area.
62	Files on mineral occurrences in the Lynn Lake area.
58	Files on industrial mineral occurrences in the Lynn Lake area.
35	Files on mineral occurrences in the Snow Lake area.
13	Files on industrial mineral occurrences in the Snow Lake area.
5	Files on mineral occurrences in the File Lake-Sherridon area.
5	Files on industrial mineral occurrences in the Flin Flon area.
4	Files on industrial mineral occurrences in the Thompson area.

v. DATA FILES:

Big Sand-Brochet	U-Pb zircon age dates
Lower Churchill	U-Pb zircon age dates
Agassiz deposit	Geochemical data file including analysis from bedrock samples, basal tills, peat and vegetation.
Cross Lake	45 REE analyses (includes 5 for Ti-V study, and 27 for pegmatite investigation).
Pipestone Lake	71 whole rock chemical analyses and trace element analyses; 43 trace element analyses, and 51 assays for titanium-vanadium study.
McGill Lake-Knee Lake	40 whole rock chemical analyses and trace element analyses and 8 REE analyses, for pegmatite investigation.
Sub-Paleozoic, SW Manitoba	Drill logs, magnetic profiles and other geophysical data from Precambrian basement beneath Paleozoic cover rocks in southwestern Manitoba (including Project Cormorant area).

vi. PRESENTATIONS: MANITOBA ENERGY AND MINES ANNUAL MEETING - NOVEMBER 20, 1985

Mineral Investigations, Highlights	G.H. Gale
Precambrian Mapping, Highlights	W. Weber
Industrial Minerals, Northern Manitoba	R. Gunter
Industrial Minerals, Southern Manitoba	D.M. Watson
Geological Survey of Canada Programming	A.G. Galley
Applied Geoscience Research, University of Manitoba (Department of Earth Sciences)	W. Last
Lynn Lake Regional compilation and geochronology	H.V. Zwanzig
Preliminary results of till sampling in the Lynn Lake area including the Agassiz Metallotect	E. Nielsen
Mercury-gas surveys over Base and Precious metal deposits, Lynn Lake and Snow Lake areas	M.A.F. Fedikow
Exploring volcanic belts: the benefits of current 1:20 000 scale mapping programs in the Flin Flon belt	A.H. Bailes
Progress in the Rb/Sr geochronology programs in Manitoba	G.S. Clark

Structural analysis of the San Antonio Mine and surrounding area, Bissett, Manitoba	K.H. Poulsen[*] S. Lau W.C. Brisbin D.E. Ames A.G. Galley
Aspects of the petrology and platinum-palladium distribution in the ultramafic portions of the Bird River Complex	P. Theyer

OTHER PRESENTATIONS

Use of VLF data in an integrated remote sensing interpretation in north central Manitoba
by Anderson, D.T., Anderson, C.D. and Misra, K.S. at CIM Ninth District Four Meeting, Thompson, September, 1985.

MDA projects specific to Lynn Lake district
by D.A. Baldwin at Lynn Lake Town Council.

Subaerial, pyroclastic volcanism in the Rusty Lake metavolcanic belt
by D.A. Baldwin at Geology Club, Brandon University.

Mineral exploration in Manitoba - 1984
by P. Doyle at CIM Ninth District Four Meeting, Thompson, September 1985.

Stratigraphic and structural evolution of the Cross Lake supracrustal belt in northwestern Superior Province, Manitoba
by M.T. Corkery at Institute on Lake Superior Geology, Kenora, Ontario, May 1985; also at CIM Ninth District Four Meeting, Thompson, September 1985.

Rock, basal till and vegetation geochemical signatures of the Agassiz stratabound Au-Ag deposit, Lynn Lake, Manitoba
by M.A.F. Fedikow and E. Nielsen at International Geochemical Exploration Symposium, Association of Exploration Geochemists, Toronto, April 1985.

Gold deposits associated with the Agassiz Metallotect and the Johnson Shear Zone, Lynn Lake area, Manitoba
by M.A.F. Fedikow and C. Taylor at Canadian Institute of Mining and Metallurgy "Gold in the Western Shield" Symposium, Saskatoon, 1985.

Stratigraphic evolution of the Island Lake greenstone belt (Poster Session)
by H.P. Gilbert at Institute on Lake Superior Geology, Kenora, Ontario, May 1985.

Gradiometer interpretation of the Flin Flon mineral belt
by I.T. Hosain at CIM Ninth District Four Meeting, Thompson, September 1985.

The distribution of glacial erratics in Manitoba and adjacent parts of Saskatchewan and Ontario (Poster Session)
by E. Nielsen at Archeological Association of Canada, Winnipeg, Manitoba, May 1985

The Laurentide Ice Sheet and long-distance transport.
by V.K. Prest (speaker) and E. Nielsen, 1985 at International Quaternary Association Commission on the Genesis of Till, Finland.

Quaternary stratigraphy of the Hudson Bay Lowlands
by E. Nielsen at the Geological Association of Canada, Winnipeg Section.

Glaciological reconstruction of a Late Wisconsinan Sublobe of the Laurentide Ice Sheet, Southern Manitoba
by E. Nielsen and L.H. Thorliefson at Geological Association of Canada, Fredericton, New Brunswick.

Platinum group elements in the Bird River Sill
by P. Theyer at the Fourth International Platinum Symposium, Toronto.

Platinum-palladium distribution and petrology of the ultramafic part of the Bird River complex, Manitoba
by P. Theyer at the Prospectors & Developers Association Convention on March 12, 1986.

The timing of the Pikwitonei granulites in relation to Superior-Churchill Province tectonics
by W. Weber at the Lunar and Planetary Institute Seminar Series, Houston, Texas, October 1985.

vii. FIELD DEMONSTRATIONS

H.V. Zwanzig	Kisseynew south margin, Flin Flon region Five-day field demonstration to geologists of the exploration industry of MGSB, GSC, University of Regina; June 1985.
W. Weber	Bissett region, Stormy Lake One-day field demonstration to geologists from exploration industry, MGSB, GSC and University of Manitoba.
E.C. Syme	Flin Flon area One-day field demonstration to geologists from HBED, GSC and University of Manitoba; June 1985.
A.H. Bailes	Chisel Lake-Snow Lake area One-day field demonstration for HBED, GSC and University of Manitoba; June 1985.

viii. DISPLAYS

	Canada	Manitoba
Annual Meeting with Industry, Winnipeg, November 1985	9	33
Annual Geological Survey of Canada Forum, Ottawa, January 1986	1	-
Annual Prospectors and Developers Convention, Toronto, March 1986	1	1

ix. PHYSICAL ASSETS (MAJOR)

Varian Spectra AA40 atomic absorption spectrophotometer to facilitate major, trace and rare element analyses at the Logan Avenue Analytical Laboratory, Winnipeg.

CANADA

x. REPORTS

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1985: The geology of the Nicoba Zn-Cu deposit, Lynn Lake, Manitoba: preliminary results; in Current Research, Part B, Geological Survey of Canada, Paper 85-1B, p. 499-509.

Barnham, B.A. and Froese, E.
1986: Geology of the New Fox alteration zone, Laurie Lake, Manitoba; in Current Research, Part B, Geological Survey of Canada, Paper 86-1B (in press).

Froese, E.
1985: Anthophyllite-bearing rocks in the Flin Flon-Sherridon area, Manitoba; in Current Research, Part B, Geological Survey of Canada, Paper 85-1B, p. 541-544.

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1986: Deformation in the Thompson Belt: a progress report; in Current Research, Part B, Geological Survey of Canada, Paper 86-1B (in press).

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1986: Metamorphic studies in the transition zone between the Lynn Lake Greenstone Belt and the Kisseynew Gneiss Belt, Laurie Lake, Manitoba; in Current Research, Part B, Geological Survey of Canada, Paper 86-1B (in press).

Kaszycki, C.A. and DiLabio, R.N.W.
1986: Surficial geology and till geochemistry in the Lynn Lake-Leaf Rapids region, Manitoba; in Current Research, Part B, Geological Survey of Canada, Paper 86-1B (in press).

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b) Manitoba Energy and Mines Report of Activities 1985 Publication

Krogh, T., Heaman, L., Machado Fernandez, N. and Weber, W.
1985: GS-36 U-Pb geochronology program: Thompson Belt and Pikwitonei Domain; in Report of Field Activities 1985, Manitoba Department of Energy and Mines, p. 183-184.

c) Geological Survey of Canada Preliminary Reports and Maps

Regional lake sediment and water geochemical reconnaissance data, Province of Manitoba (64B, 64F and 64G); Geological Survey of Canada, open files 1103, 1104 and 1105.

Till geochemistry, Granville Lake (64C), Manitoba, C.A. Kaszycki and R.N.W. DiLabio; Geological Survey of Canada, open file 1204.

Surficial geology, Granville Lake (64C), Manitoba, C.A. Kaszycki. V. Way Nee, E. Nielsen and R.N.W. DiLabio; Geological Survey of Canada, open file 1258.

Surficial geology, Stull Lake (53K), Manitoba, M.D. Clarke; Geological Survey of Canada, open file 1226.

Surficial geology, Oxford House (53L), Manitoba, M.D. Clarke; Geological Survey of Canada, open file 1227.

xi. EXTERNAL PUBLICATIONS

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Barham, B.A.
1986: Cordierite-orthoamphibole-garnet rocks of the New Fox alteration zone, Laurie Lake, Manitoba; Geological Association of Canada-Mineralogical Association of Canada, Program with Abstracts, v. 11, p. 43.

Galley, A.G., Ziehlke, D.V., Franklin, J.M., Ames, D.E. and Gordon, T.M.
1985: Gold mineralization in the Snow Lake-Wekusko Lake region, Manitoba; in Gold in the Western Shield, CIM Special volume (in press).

xii. PRESENTATIONS/DISPLAYS

a) GSC Current Activities Forum, January 21-23, 1986, Ottawa

Kaszycki, C.A. and DiLabio, R.N.W.: Sedimentology and geochemistry of surficial materials within Lake Agassiz Basin, Lynn Lake-Leaf Rapids area, Manitoba.

Scoates, R.F.J., Duke, J.M., Eckstrand, O.R. and Williamson, B.: Layer disruption, PGE mineralization, and the role of supercooling in the crystallization of the Bird River Sill, Manitoba.

Poster about Till geochemistry, Granville Lake-Brochet area, Manitoba: Kaszycki, C.A. and DiLabio, R.N.W.

b) Manitoba Energy and Mines Annual Meeting with Industry, November 19-20, 1985, Winnipeg

Duke, J.M., Williamson, B.L. and Scoates, R.F.J.: Chromite deposits, Bird River Sill, Manitoba.

Galley, A.G.: Activities of the Geological Survey of Canada in Manitoba during the 1985-1986 field season.

Poulsen, K.H., Ames, D.E., Lau, S., Brisbin, W.C. and Galley, A.G.: Structural analysis of the San Antonio Mine and surrounding area, Bissett, Manitoba.

Poster about Vein geometry at the San Antonio Mine: Lau, S., Brisbin, W.C. and Ames, D.E.

Poster about Structural studies in the Bissett area, Manitoba: Ames, D.E., Galley, A.G. and Poulsen, K.H.

Poster about Alteration association with the New Fox deposit, Lynn Lake, Manitoba: Barham, B.A.

Poster about Alteration studies at the Osborne Lake Mine, Manitoba: Bristol, C. and Froese, E.

Poster about Pressure-temperature conditions of metamorphism in the Laurie Lake Region, Manitoba: Jackson, S.L.

Poster about Till geochemistry of the Lynn Lake region, Manitoba: Kaszycki, C.A. and DiLabio, R.N.W.

Poster about Morphology and mineralization in the Chromitiferous zone, Bird River Sill, Manitoba: Williamson, B., Scoates, R.F.J. and Duke, J.M.

Poster about Alteration study of the Linda deposit, Snow Lake, Manitoba: Zaleski, E.

Poster about Aeromagnetic total field and vertical gradient maps of the Lynn Lake-Laurie Lake region and of Issett-Pemichigamau Lake region: Hood, P.J. and others.

Poster about Regional lake sediment and water geochemical surveys in Manitoba: Friske, P.W.B. and Schmitt, H.R.

Poster about Internal fabric and mineralization of the Falcon Lake igneous complex: Mandziuk, W., Brisbin, W.C. and Scoates, R.F.J.

Poster about mafic-ultramafic plutons of the Flin Flon-Snow Lake area: Young, J. and Ayres, L.D.

c) Prospectors and Developers Association, March 10-12, 1986, Toronto

Poster about Till geochemistry of the Lynn Lake region, Manitoba: Maszycki, C.A. and DiLabio, R.N.W.

d) Outside meetings and field trips

Galley, A.G.: Gold metallogeny of the Flin Flon-Snow Lake Belt. Talk given to the official gold delegation, People's Republic of China.

R. Skirrow led several tours to the alteration zone south of the Chisel Mine.

1986-87 WORKPLAN

The joint Federal/Provincial Workplan for 1986-87 was approved by MDA Management Committee in Ottawa (February 27, 1986) and copies distributed to members of the Mineral Exploration Liaison Committee on March 21st. Oral briefings on the Federal and Provincial Geoscientific Programs are planned for April 17th at the Winnipeg Branch of the CIM.

In 1986, 55 Provincial and 22 Federal projects will be mounted with operational budgets slightly in excess of one million, and two million dollars, respectively.

LYNN LAKE

Manitoba Geological Services Branch (MGSB)

In the Lynn Lake region much of the basic mapping and documentation has been completed and a listing of all Lynn Lake directed outputs is available on request. The province's current involvement with the region began in 1976 with the closing of the Farley Lake Mine and the recognition that reserves at Fox and Ruttan were of limited extent. Since 1976 a very active presence has been maintained in the region, and numerous annual reports of activities, preliminary maps, open file reports, and geological papers have been issued, and numerous talks, briefing sessions and field demonstrations given to personnel interested or active in the area. Geological mapping has been upgraded to a scale of 1:20 000 for all greenstone areas, and much of the surrounding gneissic terrain has been mapped at a scale of 1:50 000.

In 1986 MGSB efforts will focus principally on:

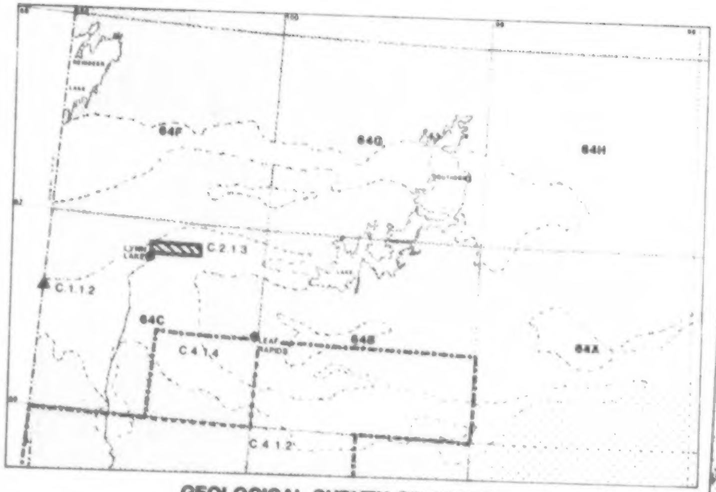
1. completing reports and maps on the Big Sand-Brochet region;
2. reporting on more U-Pb, and Rb/Sr isotopic ages for the Lynn Lake-Ruttan Greenstones and the S.I.L. gneissic terrain;
3. preparing 1:250 000 synoptic compilations for NTS areas 64F, 64G and 54E; publishing 64H; 64C will be out in September 1986, and 64B will be released April 25th;
4. 1:50 000 geological maps for Kamuchawie, Kadeniuk, and Eden Lakes are close to completion as is the 1:20 000 scale map for Granville Lake, and a report on the Sickle sediments in the Lynn Lake belt.

Mineral Investigations crews will complete documentation of all significant mineral occurrences at Margaret, Shield, Ralph, Barbara, Berge and Motriuk Lakes, and a report on the Ruttan area should be available in September of this year.

Basal till studies will be mounted in the Ruttan, Nickel and Spider Lake areas.

A MDA-sponsored M.Sc. thesis on the Fox Mine is also close to completion.

The industrial mineral potential of the Leaf Rapids-Lynn Lake area, as well as possible building stone in the Thompson Belt, will be investigated.



GEOLOGICAL SURVEY OF CANADA

PALEOZOIC
▦
PROTEROZOIC (CHURCHILL)
▦ GRANITOID TERRAIN
☐ VOLCANO-SEDIMENTARY TERRAIN
ARCHEAN (SUPERIOR)
▦ GRANITOID TERRAIN
▦ VOLCANO-SEDIMENTARY TERRAIN

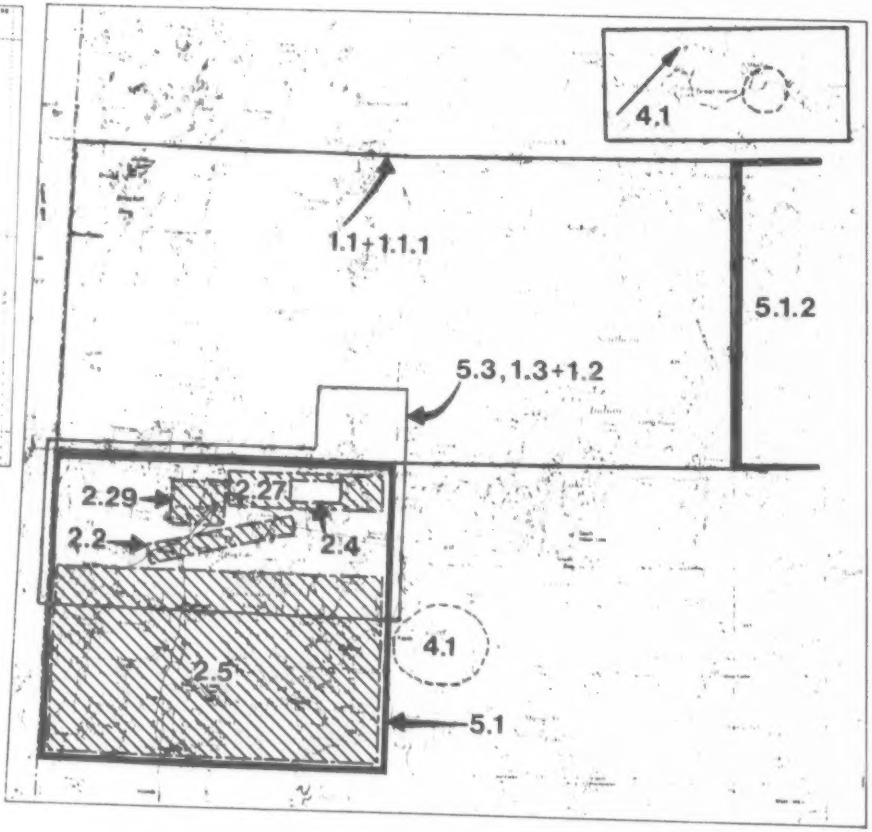
▨ MINERAL INVESTIGATIONS
-·-·- GLACIAL PROSPECTING
▲ PRECAMBRIAN INVESTIGATIONS

C.2.1.3 Agassiz Remote Sensing
Base: Winnipeg/Lynn Lake
Officer: U of M

C.4.1.2 Glacial Prospecting
Officer: C. Kaszycki
Base: Sherridon

C.4.1.4 Quaternary Geochemistry
Officer: C. Kaszycki
Base: Sherridon

C.1.1.2 Metamorphism - Laurie Lk.
Officer: S. Jackson (Queens)
Base: Laurie Lake



MANITOBA GEOLOGICAL SERVICES BRANCH

1.1	Geological mapping brochet-Big Sand Lake
1.1.1	U-Pb geochronology SIL-Chipewyan districts
1.2	Uranium/Lead isotope investigations
1.3	Rubidium-strontium investigations
2.2	Gold deposits, Johnson Shear
2.4	Geochemistry, biogeochemistry and stratigraphy of the Agassiz Metallotect
2.5	Industrial Minerals evaluation
2.27	Remote Sensing Computer Evaluation (Federally Funded)
2.29	Mineral Deposit Geology, Lynn Lake area
4.1	Basal Till investigation, Ruttan
5.1	Synoptic geological compilation map 64C
5.1.2	Synoptic geological compilation map 64H, 54E
5.3	Lynn Lake reports and maps

Figure 10: Location of Sector A projects (1986) DISTRICT I: LYNN LAKE - RUTTAN

Geological Survey Canada (GSC)

Detailed mapping by the GSC in the vicinity of Laurie Lake and the Fox Mine will document chemical and mineralogical changes in the rocks related to metamorphism. The work constitutes a Ph.D. at Queen's University.

The University of Manitoba will evaluate the contribution of integrated multi-type data analysis to geological mapping and mineral exploration, along strike from Sherritt Gordon's new gold mine, and the use of Remote Sensing to detect stressed vegetation in the vicinity of undetected mineral deposits.

Glacial Prospecting programs by the Terrain Sciences Division will entail:

(a) regional till sampling and surficial mapping of NTS areas 63N, 63-O(W1/2) and 64B(S1/2); and
(b) research into the influence of glacial Lake Agassiz clays on the geochemistry of recent lake sediments, including deep coring of several lakes to assess vertical variations in geochemistry and possible vertical pathways for metal migration.

On April 29, 1986, 1:50 000 scale total field and vertical gradient maps were released for the Laurie Lake-Lynn Lake and Issett Lake-Pemichigamau Lake areas of Manitoba, as well as the May Lake-Lower Waddy Lake area in Saskatchewan. These maps may be purchased from the GSC offices in Ottawa and Calgary.

FLIN FLON

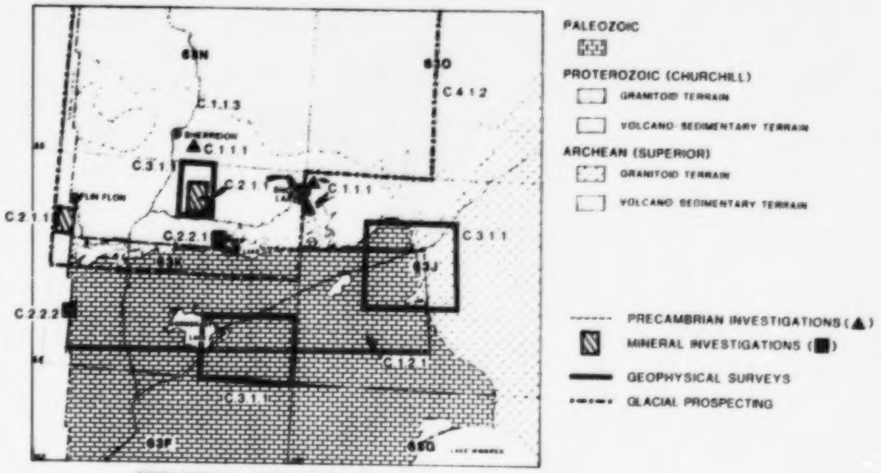
(MGSB)

The main thrust of the Province's efforts will, in this and many of the future years, be directed to the Flin Flon-Snow Lake area where systematic 1:20 000 scale mapping is being undertaken in the Athapapuskow region and southwest of Chisel Lakes.

Recent maps of the Flin Flon-White Lake area have produced significant new insights and discoveries regarding the stratigraphy and structure of the greenstone sequences in that area and this definitive coverage will be extended into the quite different supracrustal sequences around Athapapuskow and Chisel Lakes.

To the north of Flin Flon, an initial reconnaissance of the Tartan and Aimee Lakes area will be undertaken and, further north, attempts will also be made to unravel the complicated structure and lithologic sequences associated with the Kisseynew metallotect. This year 1:20 000 scale mapping will be continued at Kississing Lake, and of isolated basin and dome structures at Weasel Bay and east of Florence Lake.

Within the greenstones detailed mapping will be extended at Baker Patton and Leo Lake, at Tartan Lake and Vamp Lakes, as will detailed investigations at Neso and Fay Lakes and examination of drill core from the


63N
63O
C 4.1.2
C.1.1.3
SHERRIDON
C 1.1.1
C 3.1.1
C 2.1.1
FLIN FLON
C 2.1.1
C 1.1.1
C 2.2.1
C 3.1.1
63J
C 2.2.2
C 1.2.1
C 3.1.1
63F
63G
PALEOZOIC
PROTEROZOIC (CHURCHILL)
GRANITOID TERRAIN
VOLCANO SEDIMENTARY TERRAIN
ARCHEAN (SUPERIOR)
GRANITOID TERRAIN
VOLCANO SEDIMENTARY TERRAIN
PRECAMBRIAN INVESTIGATIONS (▲)
MINERAL INVESTIGATIONS (■)
GEOPHYSICAL SURVEYS
GLACIAL PROSPECTING

GEOLOGICAL SURVEY OF CANADA

C.1.1.1 Mineralized Alteration Zones
Officers: E. Froese (GSC) Wolverton Lake
Cook Lake
E. Zaleski (U of M.) Linda Deposit
Base: Snow Lake

C.1.2.1 Subpaleozoic Drilling Program
in house compilation

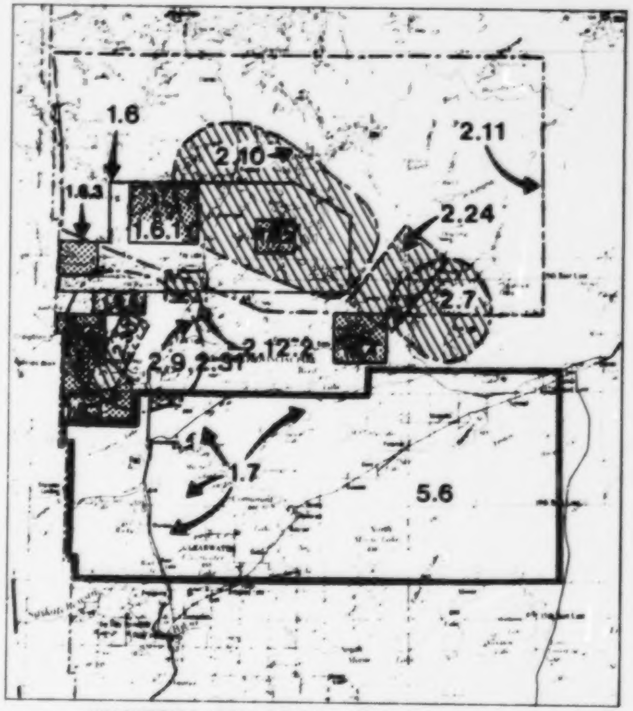
C.2.1.1 Flin Flon-Snow Lake Metallogeny
Officers: A. Galley (GSC)
D.E. Ames (GSC)
Base: Flin Flon (June)
Snow Lake (July)
Elbow Lake (August)

C.2.2.1 Mafic-Ultramafic Rocks: Reed Lake Complex
Officer: J. Young (U of M)
Base: Reed Lake

C.2.2.2 Mafic-Ultramafic Rocks: Namew Lake Deposit
Officer: L. Hulbert (GSC)
Base: Flin Flon

C.3.1.1 Gradiometer Survey: Moose River, Hargrave River,
Elbow Lake
Company:

C.4.1.2 Glacial Prospecting
Officer: C. Kaszycki (GSC)
Base: Sherridon


1.6
2.10
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2.12.2
2.9, 2.31
1.7
5.6

MANITOBA GEOLOGICAL SERVICES BRANCH

1.5	1:20 000 mapping Flin Flon, etc.
1.5.3	1:20 000 mapping Athapapuskow Lake
1.5.4	1:20 000 mapping Chisel Lake
1.5.5	Tartan Lake geological mapping
1.6.1	1:20 000 Kississing Lake mapping
1.6.2	1:20 000 Moody Lake mapping
1.6.3	1:20 000 Kisseynew Lake west mapping
1.7	Scout drilling, Project Cormorant
2.7	Gold deposits Snow Lake area
2.9	Deposit documentation Flin Flon
2.10	Deposit documentation Sherridon
2.11	Industrial minerals evaluation
2.12.2	Vamp Lake deposit
2.24	Copper-Zinc deposits, Snow Lake area
2.30	Mineral deposit geology, Flin Flon area
2.31	Metallogeny Felsic Intrusions
5.6	Subpaleozoic compilation

Figure 11: Location of Sector A projects (1986) DISTRICT II: FLIN FLON-SNOW LAKE

Pine Bay and Centennial Mines and the Copperman deposit. Detailed documentation of the gold deposits at Wekusko Brook, Dionne, Niblock and Cook Lakes and at Woosey and Morgan Lakes will be initiated. Showings at Walton, Wood, Evans, Shura and Batty Lakes will be mapped and sampled in detail.

South of the exposed greenstones additional scout drill holes will be completed to augment coverage obtained in previous years and to check interpretations of the basement lithologies made by consultants in a pilot compilation of the Cormorant Lake Sheet, NTS 63K. Industrial minerals activities will entail detailed sampling and collection of data on the cordierites of the Nelson House region, talc at Iskwasum Lake, building stone and kaolin, and the garnet and sillimanite deposits at Star Lake, the latter in cooperation with the University of Manitoba.

The University of Manitoba will initiate a geochemical study of intrusions in the Flin Flon region as an initial step to defining their petrological and metallogenic relationships.

(GSC)

In the Flin Flon-Snow Lake district Precambrian studies will concentrate on examining mineralized alteration zones, principally those associated with volcanogenic massive sulphide deposits. Alteration zones will be investigated at Cook and Wolverton Lakes, near Snow Lake, at the Linda deposit, and in the Sherridon area. The latter study will look for and attempt to measure changes in mineral composition related to distance from massive sulphide deposits.

The U/Pb geochronology program will continue to provide much needed data on the geological history of the Flin Flon-Snow Lake area.

The Sub-Paleozoic Compilation and Drilling Program will aim to interpret the Precambrian geology beneath the Paleozoic cover rocks adjacent to the edge of the Shield. A final report from a consulting firm will be received by late spring. This will be followed by an in-house compilation and interpretation of geophysical data. Follow-up drilling is planned for the winter of 1986-87.

Mineral Investigations in the area involve the study of gold metallogeny, the metallogeny of mafic and ultramafic rocks and the study of deep footwall alteration zones below massive sulphide deposits.

A Master's degree will be completed at Carleton University on the pervasive silicification of rocks deep in the footwall to the Chisel Mine. Gold studies will involve mapping of areas containing gold deposits in the Elbow Lake and Snow Lake regions, as well as around Phantom Lake, in Saskatchewan.

A University of Manitoba study, characterizing the mafic and ultramafic intrusions in the Flin Flon-Snow Lake belt, will concentrate this year on the Reed Lake Pluton.

The Namew Lake PGE-nickel deposit will also be investigated.

Aeromagnetic gradiometer surveys will continue in areas centered on Moose River, Hargrave Lake and Elbow Lake.

Glacial prospecting, with till sampling and surficial mapping, will continue southward from District 1 to include the North half of NTS of 63K.

SOUTHEAST MANITOBA

(MGSB)

In southeast Manitoba, mapping of the Manigotagan and Stormy Lake Formations near Long Lake will continue, as will an industrial minerals inventory of building and flagstones, and sampling of kaolin on Black Island.

The evaluation of Platinum Group Elements will be extended to other segments of the Bird River Complex.

Documentation of gold-bearing environments in Wallace Lake and the Bissett region will continue.

(GSC)

In the Bissett area, the GSC will continue regional structural studies in the area centered on the San Antonio Gold Mine. The University of Manitoba will continue its work on the mine-scale structures controlling the gold mineralization.

On the Chrome Property, in the Bird River layered intrusion, mapping of the chromite horizons will continue at a 1:100 scale.

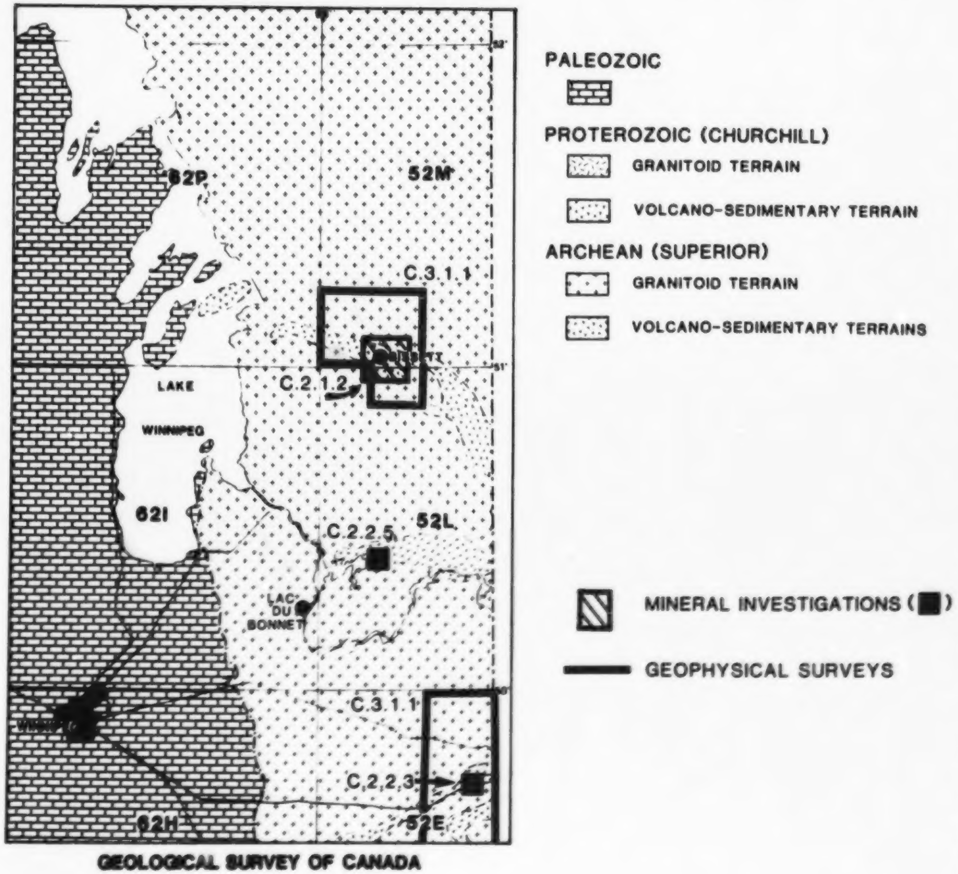
Further south, several students from the University of Manitoba will engage in studies on the Falcon Lake Stock including a thesis on the internal structure of the plug as well as studies of the petrography and gold mineralization, the latter centered on the Sunbeam-Kirkland Mine.

Airborne gradiometer survey will be conducted over the Rice Lake region as well as in the Whitemouth area.

THOMPSON

(MGSB)

In the Thompson region two field trips will be held, one in June for geologists working in the nickel belt, and the other in August for the benefit of NASA geologists studying terrestrial and lunar anorthosites. The detailed 1:20 000 scale mapping at Cross Lake is now well advanced, and this year crews will focus on the western extensions of the greenstones up to Minago River, Sipiwesk and Duck Lakes. Particular attention will be given to anorthositic gabbros west of the Nelson River, to further document this unique group of intrusions that, at Pipestone Lake, contain significant amounts of iron, titanium, vanadium and niobium.


52P
52M
LAKE
WINNIPEG
62I
52L
62H
52E
C.3.1.1
C.2.1.2
C.2.2.5
C.2.2.3
LAC DU BONNET
PALEOZOIC
PROTEROZOIC (CHURCHILL)
GRANITOID TERRAIN
VOLCANO-SEDIMENTARY TERRAIN
ARCHEAN (SUPERIOR)
GRANITOID TERRAIN
VOLCANO-SEDIMENTARY TERRAINS
MINERAL INVESTIGATIONS (■)
GEOPHYSICAL SURVEYS

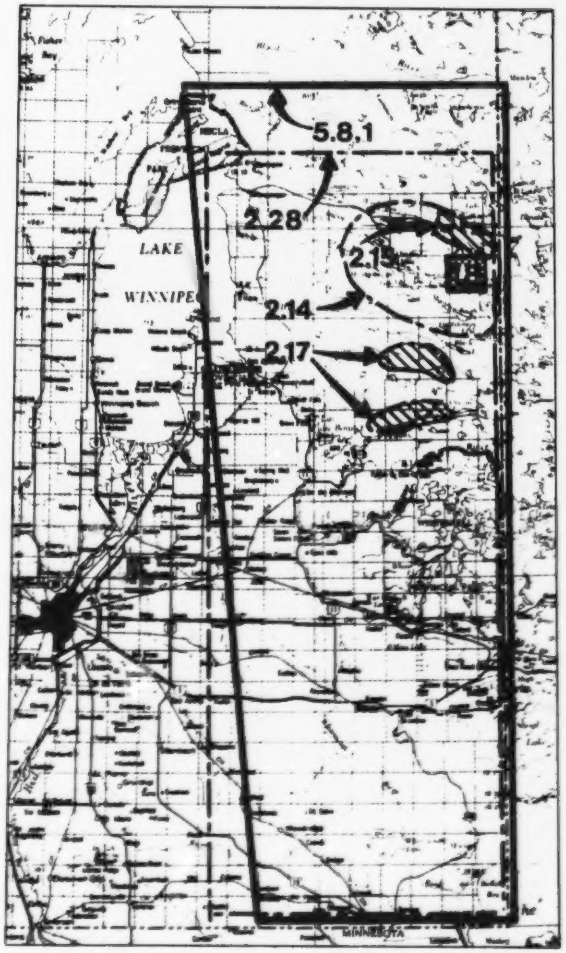
GEOLOGICAL SURVEY OF CANADA

C.2.1.2 Bissett Structural Studies
Officers: K. Poulsen (GSC) (August)
D.E. Ames (GSC), A. Galley (GSC) (May)
Base: Bissett

C.2.2.3 Mafic-Ultramafic Rocks: Falcon Lake Stock
Officer: W. Brisbin (U of M), N. Halden (U of M)
Base: U of M Field Station

C.2.2.5 Mafic-Ultramafic Rocks: Bird River Sill
Officer: J. Scoates (GSC), B. Williamson (GSC)
Base: Talltimber Lodge, Lac DuBonnet

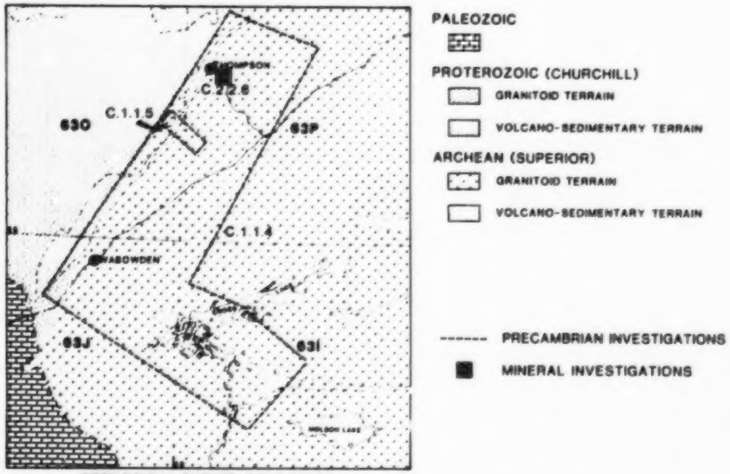
C.3.1.1 Gradiometer Survey: Whitemouth, Rice Lake


LAKE
WINNIPE
5.8.1
2.28
2.15
2.14
2.17
MINNESOTA

MANITOBA GEOLOGICAL SERVICES BRANCH

1.8	Rice Lake geological mapping
2.14	Deposit documentation Rice Lake area
2.15	Wallace Lake gold deposits
2.17	Platinum element evaluation
2.28	Dimension stone, resource assessment
5.8.1	Geological compilation

Figure 12: Location of Sector A projects (1986) DISTRICT III: SOUTHEAST MANITOBA

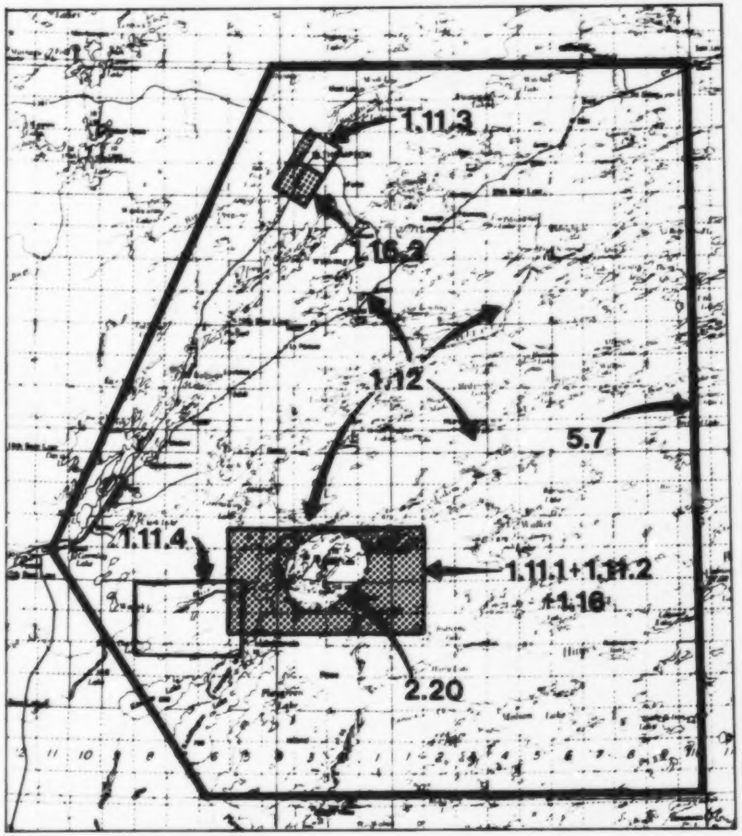

THOMPSON
C.2.2.6
C.1.1.5
63O
63P
C.1.1.4
WABOWDEN
63J
63I
PALEOZOIC
PROTEROZOIC (CHURCHILL)
GRANITOID TERRAIN
VOLCANO-SEDIMENTARY TERRAIN
ARCHEAN (SUPERIOR)
GRANITOID TERRAIN
VOLCANO-SEDIMENTARY TERRAIN
PRECAMBRIAN INVESTIGATIONS
MINERAL INVESTIGATIONS

GEOLOGICAL SURVEY OF CANADA

C1.1.4 U/Pb Geochronology, Northwestern Superior Province
Officer: Davies (ROM)
Base: Cross Lake

C.1.1.5 Structural Studies, Thompson Belt
Officer: F. Feuten (U of T)
Base: Thompson

C.2.2.6 Thompson Nickel Belt
Officer: W. Bleeker (U of NB)
Base: Thompson


1.11.3
1.16.2
1.12
5.7
1.11.4
1.11.1+1.11.2
+1.16
2.20

MANITOBA GEOLOGICAL SERVICES BRANCH

1.11.1	Cross-Pipestone Lake mapping
1.11.2	Titanium-vanadium evaluation
1.11.3	Thompson Pit mapping
1.11.4	Nelson River anorthosite evaluation
1.12	Uranium/Lead geochronological sampling
1.16	Rubidium-strontium isotope investigations
1.16.2	Thompson geochemistry
2.20	Rare-element enriched pegmatite evaluation
5.7	Thompson-Pikwitonei compilation

Figure 13: Location of Sector A projects (1986) DISTRICT IV: THOMPSON

Work on lithium, tantalum and beryllium-bearing pegmatites at Cross Lake continues to provide valuable new information on fractionation trends in these bodies, and this year work will extend to Red Sucker Lake where initial sampling has revealed significant new petalite occurrences.

Within the Thompson belt itself detailed mapping will begin in, and around the new Thompson Pit as part of a cooperative GSC, INCO and Provincial study that will also provide information to be compiled into the 1:250 000 synoptic compilation scheduled for the region.

A geochemical study will be initiated, with the University of Manitoba to fingerprint the various intrusive phases adjacent to the Churchill-Superior boundary and reveal more about their magmatic affinities, and mode and timing of emplacement. U/Pb zircon studies will continue to unravel the complex timing of events associated with this unique segment of the crust, specifically in the Cross Lake and Pikwitonei-Thompson region.

(GSC)

The U/Pb geochronology program under contract to the Royal Ontario Museum will continue this year, with the area of interest extended to Cross Lake, where mapping by provincial geologists has revealed well exposed rock types amenable to age dating.

A University of Toronto doctoral study will explore the structural setting of the Thompson Belt based on a detailed transect from the Pikwitonei Granulite Terrain to the Churchill-Superior boundary.

Under the Mineral Investigations sub-program the structure and related geology of the nickel deposits at the Thompson Mine will constitute a Ph.D. study at the University of New Brunswick.

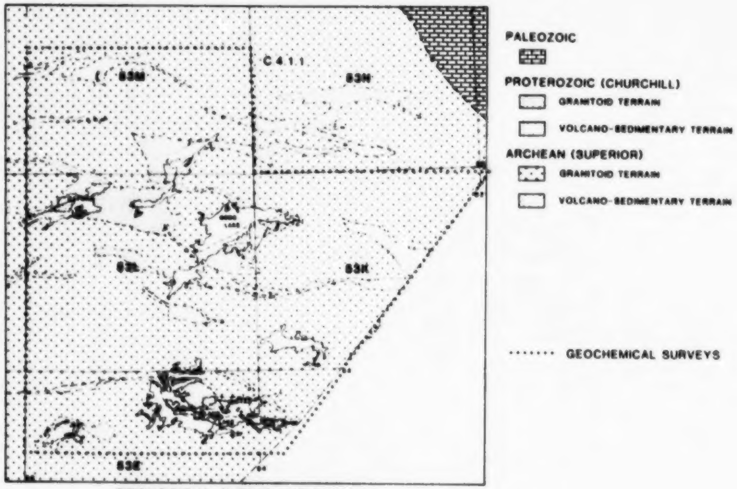
The Terrain Sciences Division will supervise a shallow seismic survey in the Thompson area along a line towards Gillam, the objective being to define thick deposits of glacial material that can be drilled during the 1987/88 season in the hope of characterizing the glaciation that has affected much of Northern Manitoba.

GODS-ISLAND LAKES

(MGSB)

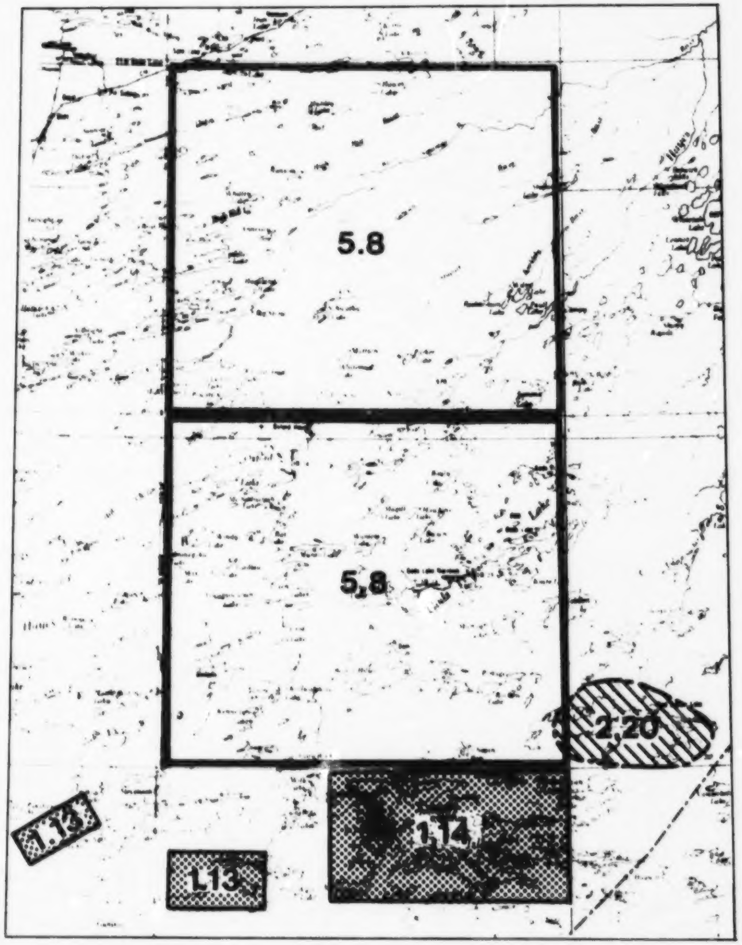
The principal activities in the Gods, Island and Oxford Lakes region will be the regional lake sediment sampling of the GSC for NTS areas 53L, 53K, 53E (N 1/2) and 53M (S 1/2).

Provincially-sponsored projects will include ongoing examination of rare-element-enriched pegmatites at Red Sucker Lake, Red Cross and Gods Lakes, the issuance of a 1:250 000 scale synoptic geological map for NTS area 53L, and the final two geological reports stemming from the Greenstone project; these will cover the Goose Lake and Munro Lake regions and will extend the 1:50 000 scale maps available for this region.


PALEOZOIC
PROTEROZOIC (CHURCHILL)
GRANITOID TERRAIN
VOLCANO-SEDIMENTARY TERRAIN
ARCHEAN (SUPERIOR)
GRANITOID TERRAIN
VOLCANO-SEDIMENTARY TERRAIN
GEOCHEMICAL SURVEYS
C 4.1.1

GEOLOGICAL SURVEY OF CANADA

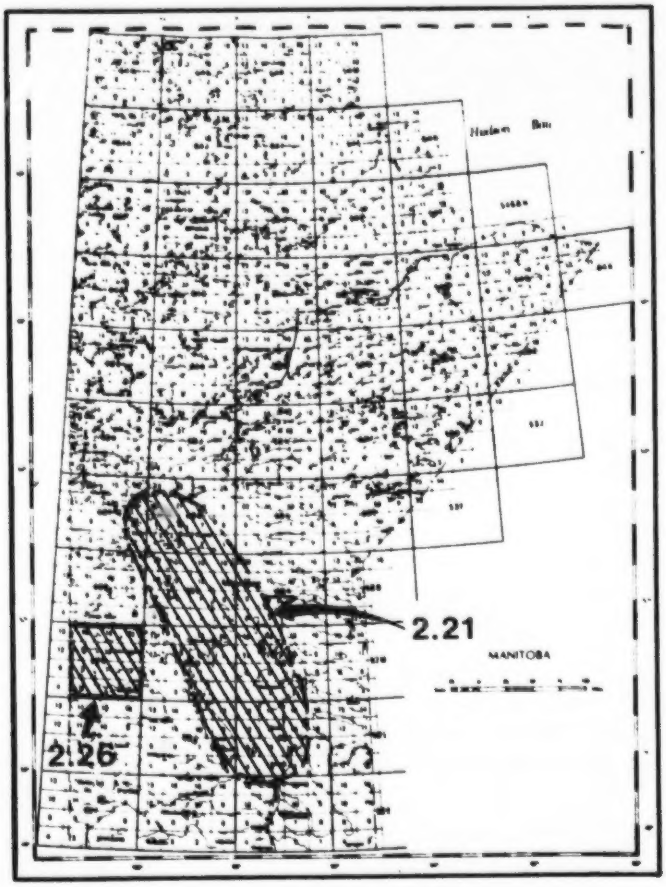
C.4.1.1 Geochemical Survey
Company: SIAL Compagnie
Internationale de
Géophysique inc.
Base: not known at present


5.8
5,8
2,20
1.13
L13
1.14

MANITOBA GEOLOGICAL SERVICES BRANCH

1.13	Bigstone and Ponask Lakes geological mapping
1.14	Island Lake geological mapping
5.8	1:250 000 synoptic geological compilation, Gods Lake

Figure 14: Location of Sector A projects (1986) DISTRICT V: GODS-ISLAND LAKE



MANITOBA GEOLOGICAL SERVICES BRANCH

1	Laboratory assistant (seasonal)
2.21	Pb/Zn in Paleozoic
2.26	Industrial minerals mapping, Dauphin Lake
5.9	Bibliography and other compilations
5.12	Winnipeg based mineral deposit compilations

Figure 15: Location of Sector A projects (1986) **DISTRICT VI: MANITOBA**

A report on the Fox River Sill is now well advanced and should be released within fiscal 1986/87.

(GSC)

Regional geochemical lake sediment surveys will cover 53K and L, plus the South half of 53M and the North half of 53E. 3400 samples will be collected, with double density wherever volcano-sedimentary sequences are encountered.

A second project will involve the compilation of several 1:250 000 scale Quaternary maps covering a large portion of the Superior Province of Manitoba. Airphoto interpretations will be ground-truthed and maps prepared of areas already completed.

MANITOBA

(MGSB)

Manitoba-general projects will constitute: (1) the issuance of a bibliography covering all geological publications dealing with the Province; (2) the ongoing inventory of gold occurrences; (3) a compilation of basement geology in the S.W. of the Province based on deep drill holes; (4) issuance of a report on Dolomite Resources of the Interlake area; (5) issuance of a general brochure on Industrial Minerals in the Province; and (6) an Industrial Minerals study of the Duck Mountain area.

In Winnipeg all petroleum and aggregate resources materials (drill core) will be consolidated at a site on Midland Street. This will permit reorganization of the Brady & Perimeter holdings so that fully fledged Precambrian core storage-examination services will become available at Brady St. by early 1987.

The annual Meeting with Industry in Winnipeg is currently scheduled for November 20th and 21st. The second meeting of the Mineral Exploration Liaison Committee will take place on or close to these dates.

(GSC)

In conclusion, 22 Federally sponsored studies will be carried out during 1986/87 in Manitoba. Of these, 12 directly involve GSC personnel, 6 have been contracted to the University of Manitoba and 6 to universities and agencies in other provinces.

TABLE 3

Forecasted expenditures for Sector A Geoscientific Activities, 1986-87

	LYNN LAKE RUTTAN	FLIN FLON-SNOW LAKE	SOUTH-EAST MAN.	THOMPSON	GODS-ISLAND	MAN. GENERAL	TOTAL
$ Allocated (x 1,000)							
FEDERAL	151.6	1062.5	310.0	41.0	548.0	-	2113.1
PROVINCIAL	194.3	356.3	132.8	143.1	15.0	178.9*	1020.4
TOTAL	345.9	1418.8	442.8	184.1	563.0	178.9	3133.5
%TOTAL	11	45	14	6	18	6	

*Includes 40.0 capital